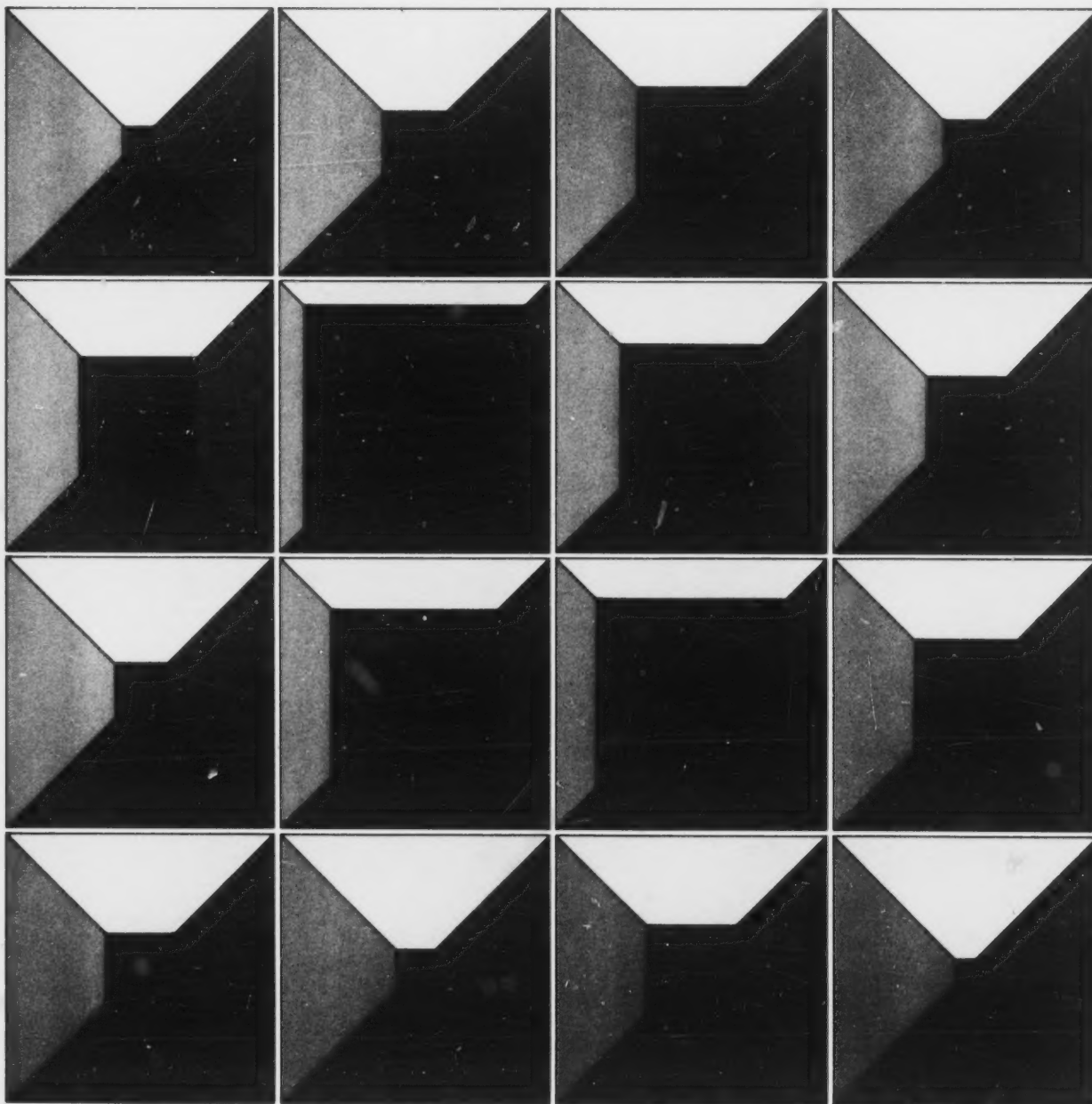


The Changing Telephone Industry: Access Charges, Universal Service, and Local Rates

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Congress of the United States
Congressional Budget Office



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**THE CHANGING TELEPHONE INDUSTRY:
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PREFACE

One of the major issues facing the U.S. telephone industry is how local telephone companies will recover the fixed costs that they have traditionally assigned to and recovered from interstate long-distance services. Recent decisions of the Federal Communications Commission (FCC) would alter traditional methods of cost recovery and have raised fears of sharply higher local telephone rates.

The Congressional Budget Office (CBO) has prepared this analysis of the impact of FCC actions on local telephone rates at the request of Senator Barry Goldwater, Chairman of the Communications Subcommittee of the Senate Committee on Commerce, Science and Transportation. In keeping with the CBO's mandate to provide objective and nonpartisan analysis, no recommendations are offered.

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Director

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SUMMARY

The facilities of local telephone companies are used both for local calls and for the completion of long-distance calls. Since the 1940s, the fixed costs of these facilities have been recovered partly from monthly charges to customers for local service and partly from revenues collected from long-distance toll calls, with the latter paying an increasing proportion over time.

The Federal Communications Commission (FCC) has decided that the traditional method of recovering a share of local fixed costs from long-distance users is economically inefficient, results in unnecessary discrimination, and provides incentives for large telecommunications customers to develop private systems that "bypass" the distribution networks provided by local telephone companies. As a result, the FCC has ordered that the traditional method should be replaced with a new system, under which each local telephone company will eventually recover its fixed costs through monthly fees--called "access charges"--paid by each subscriber.

The FCC announced its decision to develop a system of access charges in December 1982. Since that time, the FCC has made several major changes to its original proposal, and the date for implementing such charges has been postponed several times. In January 1984, the commission announced a decision to:

- o Postpone access charges for residential and one-line business customers until June 1985;
- o Limit the charges for these subscribers to no more than \$4.00 monthly until 1990; and
- o Devise a means to exempt subscribers who are unable to afford such charges.

In May 1984, access charges were imposed on multiline business customers, and an offsetting reduction was made in interstate toll rates.

The use of access charges to recover local fixed costs will align long-distance rates more closely with the costs of providing that service and reduce incentives for high-volume telecommunications users to develop private systems that do not share the fixed costs paid by other users. At the

same time, however, access charges will impose higher fixed monthly charges on subscribers. Although there is no evidence that large numbers of subscribers will discontinue service as a result of these new charges, many low-income persons may find the higher charges a hardship. Moreover, the access charges are being superimposed on several other important changes in the telephone industry.

SOURCES OF INCREASED TELEPHONE RATES

The current debate over access charges occurs at a time when the telephone industry is experiencing unprecedented changes, including the deregulation of telephone equipment, the development of competition in long-distance markets, and the divestiture of the Bell Operating Companies by the American Telephone and Telegraph Company (AT&T). It also occurs as local telephone rates are increasing substantially for a variety of reasons unrelated either to access charges or to divestiture--principally, revised depreciation practices, decisions to treat as current expenses some costs that were previously capitalized, and attempts by local telephone companies to increase their rates of return. Although much uncertainty exists over the extent of local rate increases, it appears local rates will change at least as much from other causes as from FCC actions regarding access charges. Nevertheless, of all the factors affecting local rates, access charges have gained the most attention and are the most amenable to Congressional action.

CURRENT LEGISLATIVE APPROACHES

The principal concern expressed by the Congress is the balance between the greater efficiency achievable through reallocating fixed costs and the possible hardships imposed on low-income persons. This issue was addressed in two proposals considered by the 98th Congress--H.R. 4102 and S. 1660. Although serious consideration of these bills has been deferred following the FCC's postponement of access charges, they nonetheless represent the most highly developed alternatives to the FCC plan.

The House bill, H.R. 4102, was passed in November 1983. This bill would permanently prohibit the imposition of access charges on residential and small business customers. Thus, the bill would continue a large measure of the toll support traditionally provided for local rates. The bill takes the approach that present methods of recovering fixed costs are fair and that the goal of economic efficiency should not be pursued at the expense of hardships imposed on individual subscribers.

By contrast, S. 1660 would place a moratorium on access charges imposed on residential and small business customers until January 1, 1986. Thus, the Senate bill would neither confirm the FCC's decision that fixed costs should be recovered through fixed charges nor prohibit such charges permanently. Instead, the Senate bill would provide time for additional analysis and consideration before reaching a final decision.

Both bills encourage the provision of basic local service at reduced rates (called "lifeline service") to needy subscribers. Similarly, each bill would provide assistance to companies with high fixed costs in order to protect subscribers of such companies from undue rate increases. In this respect, the bills are similar to the action taken by the FCC, which would establish a Universal Service Fund to provide assistance to high-cost companies. By providing specific eligibility definitions and assistance formulas, however, both measures would restrict the FCC's latitude to revise the programs designed to assist small companies and needy individuals. Future revisions would require further legislation. In addition, both bills would create a new panel of federal and state regulators to make final decisions on certain questions of cost allocation and recovery that are now under the jurisdiction of the FCC.

Both bills would require that charges be imposed on private telecommunications systems used as substitutes for the facilities of telephone companies. Such charges would reduce incentives for large telecommunications users to "bypass" the existing telephone network, and would make a continuation of toll support more feasible. At the same time, however, they might prove difficult to administer and have unintended consequences for the development of new technology.

ALTERNATIVE APPROACHES

A variety of alternatives are available to the FCC and the Congress to assist subscribers most adversely affected by access charges, while still realizing the efficiency gains derived from instituting charges more closely matched to service costs. These alternatives fall into two main categories--programs that address the needs of low-income individuals, and programs that provide assistance to subscribers of companies with unusually high costs.

Programs to assist needy individuals might focus on lifeline service, expansion of the present Food Stamp program to permit use of the stamps to purchase basic telephone service, or other programs of direct cash assistance. In general, programs providing cash assistance would allow needy individuals to exercise their preferences more fully than programs restricted

to the purchase of particular services. On the other hand, they might not reflect as fully as service-related programs the national concern that telephone service should be universally available. In either case, assistance would be based directly on income.

By contrast, assistance to high-cost companies would tend to convey benefits on the basis of geography rather than income, with customers of rural telephone companies the primary recipients. A variety of means are available to provide such assistance. For example, expanded Rural Electrification Administration (REA) programs might be used, or small companies most adversely affected by the FCC's access charges might be given additional time to alter traditional methods of cost allocation and recovery. Such assistance would benefit wealthy as well as poor subscribers, however, and affect all aspects of the telephone companies' financial performance in addition to rates charged for local service.

CHAPTER I. INTRODUCTION

Recent decisions by the Federal Communications Commission (FCC) require the telephone industry to alter the manner in which costs are allocated and recovered. The effect of these changes will be to increase fixed monthly charges paid by subscribers and to reduce long-distance toll rates. Although these actions will increase efficiency, concern has been expressed that they will also result in rate increases for local telephone service and cause hardships for many individuals. This analysis addresses these concerns and considers alternative strategies that the Congress could adopt if it decides that the consequences of the FCC decisions require corrective action. (These alternatives include H.R. 4102 and S. 1660, which are now before the Congress.)

THE PROBLEM OF FIXED COSTS

A large portion of the costs of each local telephone company are fixed in the sense that they do not vary with the amount or type of calls handled. Rather, they tend to vary with the number of subscribers served and the costs of connecting each subscriber to the telephone system--that is, those costs associated with providing the wiring and equipment to link each subscriber with the local telephone office. Because these costs are fixed, their allocation among different types of service is inherently arbitrary. Over time, a larger and larger share of these fixed costs have come to be classified as interstate and recovered through revenues from interstate toll calls. In 1982, about 26 percent of subscriber plant costs (about \$10 billion annually) was allocated to interstate service and recovered from interstate toll calls.

The FCC has concluded that the traditional practice of recovering a large share of fixed costs from interstate long-distance calls is inefficient, leads to discrimination among users, and provides incentives for high-volume customers to use private long-distance facilities, thus leaving much of the fixed cost burden to be borne by low-volume phone users. The FCC decided that these problems would be reduced or eliminated if each local telephone company recovered its fixed costs through monthly service charges paid by each subscriber rather than through continuing to recover a large share of these costs from long-distance revenues.

The FCC might have achieved this goal by reducing gradually the proportion of fixed costs allocated to interstate service. Had the FCC chosen this approach, local telephone rates would have increased over a period of time as local telephone companies increasingly recovered their fixed costs from their own subscribers. At the same time, long-distance rates would have decreased since the prices charged for this service would no longer have to cover a disproportionate share of the fixed costs. Rather than taking this course of action, the FCC chose a much more complex approach designed to reach essentially the same result.

THE "ACCESS CHARGE" DECISION

In its access charge decision, the FCC addressed the manner in which costs are recovered rather than the manner in which costs are allocated. Under this ruling, each local telephone company will continue to allocate a portion of its fixed costs to interstate service. The manner in which these costs are recovered will be radically changed, however. Rather than continuing to recover these costs from long-distance revenues, local companies will recover them from monthly fees, called "access charges," that will be paid by each subscriber.

The access charge program was originally scheduled to begin on January 1, 1984, and later delayed until April 1984. In January 1984, while the Senate was considering legislation that would place a moratorium on access charges, the FCC announced that access charges would not be imposed on residential customers or on single-line business subscribers until June 1985. (The House of Representatives had already passed a bill that would have prohibited most access charges.) Although the initial level of such charges has not yet been set, the commission has announced that monthly charges will not exceed \$4.00 until 1990. With minor exceptions, business customers that subscribe to more than one line began to pay monthly access charges of up to \$6.00 per line in May 1984.

Pursuant to a separate FCC decision, the amount of fixed costs to be allocated to interstate traffic for subsequent inclusion in the access charges will be ultimately standardized at 25 percent. Although this would be a small change from the current national average of 26 percent, some small telephone companies that currently allocate an unusually large proportion of their fixed costs to interstate service will no longer be able to do so. Relatively few customers are served by such companies. The transition to the new allocation system would take place over the 1986-1990 period.

By 1990, local telephone companies will recover most of the 25 percent of fixed costs that the FCC has determined should be allocated to

interstate service through the use of subscriber access charges. At that time, the effects of the new system of access charges will be similar to those that would have occurred if the FCC had chosen to reduce the proportion of fixed costs allocated to interstate telephone services to zero. Under either approach, local telephone companies would recover their fixed costs from their own subscribers rather than from the revenues derived from long-distance calls. Calculations of potential rate changes resulting from the combination of access charges and the standardized 25 percent allocation have led to predictions of much higher monthly telephone rates by 1990, although in principle long-distance charges would drop by an offsetting amount. The situation is complicated by several other simultaneous changes in the nation's telephone system.

OTHER CHANGES IN TELEPHONE RATES

The FCC access charge decision has occurred at the same time that the telephone industry is experiencing a series of unprecedented changes. These include the deregulation of customer premises equipment, the growth of competing carriers in the long-distance market, the development of new technologies that make it increasingly feasible for firms with large telecommunications needs to construct private systems, and the divestiture of the Bell Operating Companies (BOCs) by the American Telephone and Telegraph Company (AT&T).

In itself, the restructuring of AT&T, which occurred on January 1, 1984, would have little impact on local rates. The traditional method by which the Bell system divided long-distance revenues with independent telephone companies might have been adapted to include the divested Bell Operating Companies. Indeed, the traditional methods might have been maintained indefinitely in the absence of new technology (which makes it increasingly attractive for large telecommunications users to develop private systems) and in the absence of new competitive firms in the long-distance market. Many observers have linked the development of access charges with the AT&T divestiture, however, because all the rate changes were included in the same tariff filing.^{1/} In October 1983, the Bell Operating Companies filed tariffs with the FCC that would comply with

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1. The confusion was further increased because the tariffs were also designed to raise earning levels for the Bell system from present levels to the 12.75 percent return on investment previously authorized by the FCC. Hence, proposed reductions in toll rates did not match fully the increases in other charges.

both the requirements of the access charge decision and the requirements of AT&T's antitrust settlement with the Department of Justice.

Another simultaneous change--requests for unprecedentedly large rate increases by local telephone companies--is also unrelated to the FCC access charge decision or the AT&T divestiture. The requested increases stem from a variety of factors, principally revised depreciation practices, decisions to treat some costs that were previously capitalized as current expenses, and attempts by local telephone companies to increase their rates of return. For example, in Texas, Southwestern Bell requested that local rates be tripled as part of a \$1.7 billion increase in overall revenues.^{2/} Ultimately, the burden of scrutinizing requests for increases in local rates will fall on state public utility commissions. At the present time, they are approving only about a third of the amounts requested. But even at that rate, the size of rate requests pending (approximately \$7 billion in 1983) may lead to substantial increases in local rates. This analysis, however, focuses on the FCC decisions regarding the allocation and recovery of fixed costs, rather than on other factors that are simultaneously leading to rate changes.

PLAN OF THE PAPER

Chapter II deals with the allocation and recovery of subscriber plant costs. After describing the manner in which a large share of these costs came to be allocated to the interstate jurisdiction (and recovered from interstate toll revenues), the analysis describes the FCC's decisions to change both the system of recovery and the method of allocation. Finally, the impact of the access charge decision on local rates is estimated.

Chapter III considers the extent to which widespread service is currently available, the sensitivity of demand to changes in price, and the effect of rate changes on the widespread availability of service. Finally, Chapter IV considers alternative strategies by which the Congress might mitigate the effects of rate changes if it decides that FCC decisions will impose unacceptable costs on some consumers.

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2. In May 1984, the Texas Public Utility Commission approved revenue increases totaling \$817 million, including an increase of 30 cents per month in the rates charged for residential service.

CHAPTER II. THE ALLOCATION AND RECOVERY OF SUBSCRIBER PLANT COSTS

A large portion of the costs of each local telephone company are fixed in that they do not vary with the amount or type of calls handled. The largest part of these costs are associated with the local distribution system--the poles and wires that connect individual subscribers with the local telephone office. Over time, a larger and larger share of these fixed costs have come to be classified as interstate and recovered through revenues from interstate toll calls.

By the late 1970s, entry of new, competitive carriers into the long-distance market raised questions about the terms under which these carriers would be granted use of local distribution facilities for the origination and termination of long-distance calls. This led to an extensive proceeding at the Federal Communications Commission in which the FCC ultimately concluded that the traditional practice of recovering a large share of the costs of the local distribution system from interstate toll calls is inefficient, leads to discrimination among users, and provides incentives for high-volume customers to bypass the facilities provided by telephone companies through the use of private systems. Accordingly, the FCC has ordered changes in the allocation of fixed costs and the way that these costs will be recovered. Ultimately, most of the costs of the local distribution system that remain allocated to interstate service will be recovered through monthly charges imposed on each telephone subscriber rather than from interstate toll revenues. In contrast to the changes in the recovery of fixed costs, traffic sensitive costs (such as the costs of switching) will continue to be recovered through toll revenues. In a related proceeding, the FCC required changes in the manner in which fixed costs are allocated between interstate and intrastate services.

THE NATURE AND SIZE OF FIXED COSTS

About half of the telephone industry's costs are incurred by local telephone companies in providing the linkage between each subscriber and the local telephone office, which thereby gives the subscriber access to the entire telephone network. These costs are fixed in the sense that they do not vary with the amount of traffic carried or the number of calls made. Rather, they tend to vary with the number of subscribers served and the costs of connecting each subscriber to the system. These costs are called

either "subscriber plant" or "nontraffic sensitive" (NTS), and in this analysis, these terms are used interchangeably with the term "fixed" costs. In the final analysis, much of the debate over local telephone rates represents controversy over how these costs should be recovered.

In 1982, total subscriber plant costs were \$39 billion while total industry revenues were \$80 billion (see Tables 1 and 2). The large size of subscriber plant costs as a proportion of total costs means that recent FCC decisions about how these costs are recovered will have a substantial impact on the industry's rate structure.

The costs of subscriber plant consist of three major parts: a circuit or local loop to each subscriber, customer premises equipment, and inside wiring. The largest component is the local loop, which includes the costs of providing and maintaining a conduit--usually a copper wire carried either on poles or underground--for transmitting messages between a customer's premises and the phone company's local office. In 1982, these costs totaled \$24 billion.

Rapid progress in computer technology has permitted much more efficient telephone switching systems both for central offices and customer switchboards. Technological advances have also brought about cost reductions in long-distance transmission. The local loop, however, retains much the same technology as it has for 100 years--copper wire physically connecting customer equipment with the central office. Until technological developments comparable to those in switching and long-distance transmission occur in the local loop, the costs of providing the loop will continue to represent an ever increasing proportion of the total costs of providing telephone service.

In 1982, customer premises equipment (also referred to as CPE or terminal equipment) accounted for \$7 billion in industry costs. CPE consists of telephone sets, switchboards, and other instruments located on a customer's premises that are connected with the telephone system. Traditionally, the industry refused to permit the interconnection of noncompany owned equipment. CPE is now being deregulated, and the costs of new equipment purchased by consumers do not appear in the rate base. Some equipment, provided by telephone companies prior to deregulation, remains "embedded" in the industry's rate base and the cost of that embedded equipment is being phased out.

Inside wiring, as the name implies, consists of the wiring inside residential and commercial structures. Traditionally, telephone companies charged only a nominal fee for the installation of such wiring and capitalized the bulk of the costs. In 1982, about \$8 billion of inside wiring costs were included in the industry's total subscriber plant costs. The FCC

TABLE 1. TELEPHONE INDUSTRY SUBSCRIBER PLANT COSTS FOR 1982 (In billions of dollars)

Plant Components	Subscriber Plant Costs	Amount Allocated to Interstate Toll Service
Customer Premises Equipment	7.0	1.8
Inside Wiring	8.0	2.0
Subscriber Loop (Including connection at the central office)	24.0	6.0
Total	38.9	9.8

SOURCE: CBO estimates.

NOTES: The total amount shown as allocated to interstate service in this table (\$9.8 billion) differs slightly from the amount shown in Table 4 (\$10.2 billion) because of the use of different data bases.

Numbers may not add to totals because of rounding.

TABLE 2. TELEPHONE INDUSTRY OPERATING REVENUES FOR 1982 (In billions of dollars)

Source	Bell System ^a /	Independent Companies	U.S. Total
Local Service	29.6	5.2	34.9
Toll Service	33.9	8.4	42.3
Other	2.2	0.4	2.5
Total	65.7	14.0	79.7

SOURCE: United States Independent Telephone Association, Phone Facts (1983 edition).

a. Includes associated companies.

has recently directed the industry to treat installation costs as expenses rather than capital investments. The industry is in the process of making this transition and gradually eliminating from the rate base the previously capitalized expenses. At the same time, there is a trend toward having contractors install wiring rather than telephone company employees.

The deregulation of terminal equipment and inside wiring means that telephone subscribers will face higher one-time charges when they purchase telephone equipment or install wiring but pay lower rates for telephone services. The costs of terminal equipment and inside wiring installed in prior years will gradually be eliminated from the telephone industry's rate base. Subscriber plant costs associated with providing local loops, however, will continue to be recovered through tariffs subject to regulatory approval. Because of this difference, recent FCC decisions about cost allocation and recovery treat loop costs differently from other subscriber plant costs. In general, the costs of terminal equipment and inside wiring that have not yet been eliminated from the industry's rate base will continue to be allocated and recovered using methods similar to traditional industry practices. In contrast, major changes have been made in the allocation and recovery of subscriber loop costs.

The Present System of Toll Support for Local Rates

In the earliest days of the telephone industry, only local service was provided and each telephone company recovered its total costs from its own subscribers. With the interconnection of systems and the development of long-distance services, it became necessary to share revenues from services that were provided by two or more companies.

Over the years, the telephone industry developed a system of "separations and settlements" to deal with this problem. The first part of the process is called "jurisdictional separations." Each local operating company separates its costs into two categories--interstate and intrastate. ^{1/} Costs identified as interstate are recovered through tariffs filed with the FCC.

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1. For independent telephone companies, the costs associated with providing intrastate service are further separated into intrastate toll service and local exchange service. The Bell system is also required to split its costs between the federal and state jurisdictions (that is, between interstate and intrastate services). In most jurisdictions, it is not required to split further its costs between intrastate toll and local services. Hence, there is considerable uncertainty about how much support is provided for local service by intrastate toll rates.

Costs identified as being intrastate are recovered through a combination of intrastate toll rates and charges for local service approved by state public utility commissions. The local telephone company collects both interstate and intrastate charges from its customers on a monthly basis.

Revenues from interstate toll service are placed in a nationwide pool and AT&T then "settles" with each independent company. Each independent company withdraws from the pool of interstate toll revenues an amount equal to all the costs it has allocated to the provision of interstate service, including a return on investment.

For many years, each local telephone company recovered its subscriber plant costs from its own subscribers. In 1943, however, the separations process was changed to allocate a proportion of subscriber plant costs to interstate service. The allocation of costs was based on a measure of relative use--the portion of time that facilities were used to make interstate calls relative to the total amount of time the facilities were in use. Since about 3 percent of total telephone usage was interstate in 1943, about 3 percent of subscriber plant costs was allocated to interstate service.

In 1952, the method of apportioning costs between interstate and intrastate services was changed again. Under the new system, measures of relative usage were weighted in order to assign an increased share of costs to the interstate jurisdiction. Subsequently, the method of apportioning costs has been changed several times, and in each case a larger share has been assigned to interstate service. The measure that ultimately emerged after a complicated procedure to weight relative usage is called the interstate "subscriber plant factor" (SPF). For each telephone company, the interstate SPF represents the percentage of its subscriber plant costs that are assigned to interstate service. ^{2/}

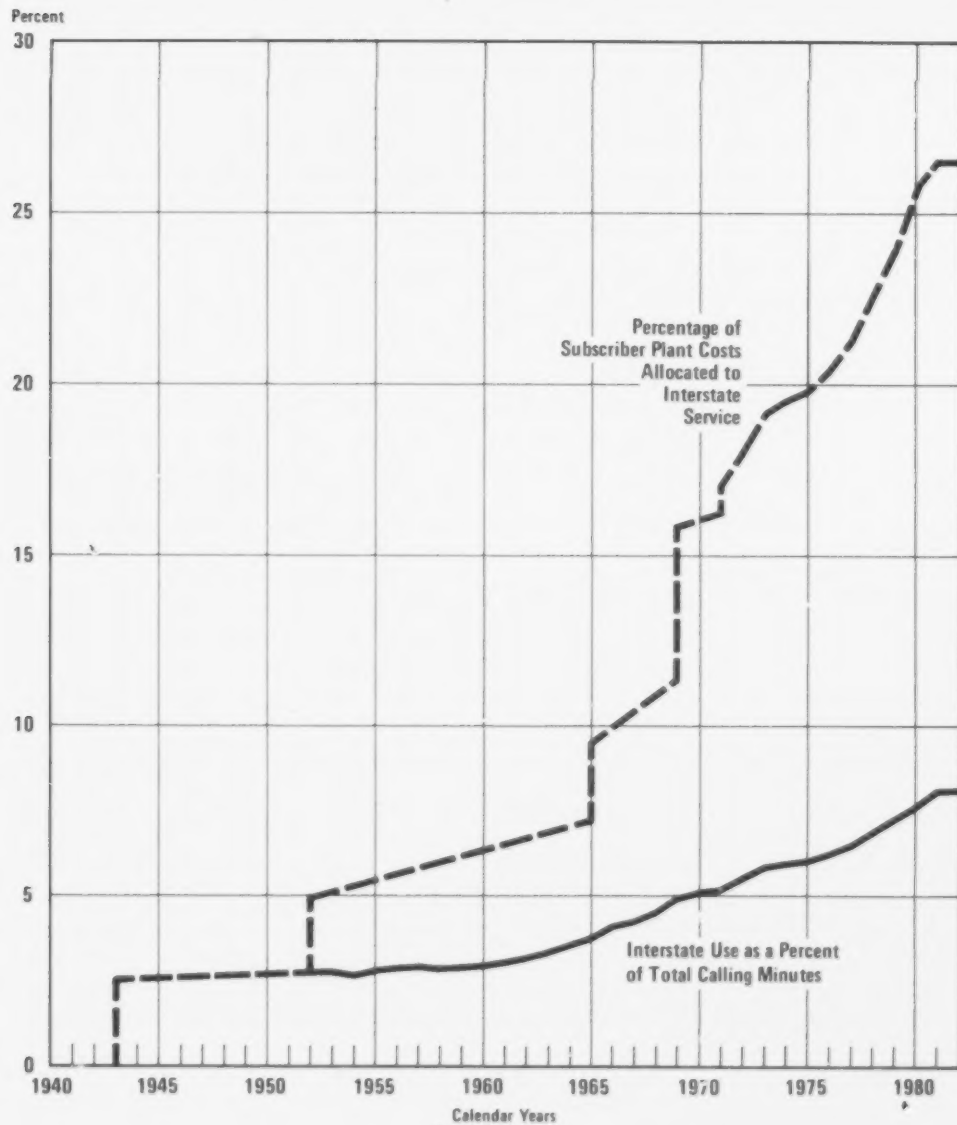
Figure 1 shows the growth in the proportion of subscriber plant costs allocated to interstate service. By 1981, of the total time that subscriber plant facilities were used, 7.9 percent was devoted to interstate calls. But because this measure of relative usage has been weighted, 26 percent of subscriber plant costs was actually assigned to interstate service and recovered through interstate toll revenues.

Decisions to assign an increasing proportion of costs to interstate service occurred in a setting of falling long-distance costs (reflecting the conversion to direct dialing and rapid technological advances) and rising

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2. For companies serving more than one state, a separate SPF is calculated for each state.

Figure 1.

Percentage of Subscriber Plant Costs Allocated to Interstate Service



SOURCE: AT&T data.

local service costs (reflecting rising input prices and the absence of similar technological advances). Rather than decreasing toll rates and increasing local rates fully to reflect these cost changes, excess revenues from toll service were used to support local rates.

Numbers for individual states and operating companies vary widely from the industry average reflected in Figure 1. The data in Table 3 reflect the wide range of variation among states within the Bell system.^{3/} Within the Bell system, the highest subscriber plant factor is 62 percent for Nevada--that is, because an unusually large proportion of Nevada calls are interstate, 62 percent of subscriber plant costs are assigned to the interstate jurisdiction and recovered from the nationwide toll pool. Nevada Bell also has unusually high costs (subscriber plant costs of \$42 per customer per month). The existence of high subscriber plant costs combined with the assignment of a large proportion of those costs to interstate service means an unusually large amount of toll support. Thus, Nevada Bell receives \$26 per month per customer from the interstate toll pool (\$42 times 62 percent).

Companies that are able to assign a large proportion of their fixed costs to interstate service sometimes argue that, because they receive a large amount of toll support with which to subsidize local rates, their customers would be most adversely affected by elimination or reduction in toll support. The reasonableness of this argument is unclear, however, since such companies receive a large amount of toll support basically because a large number of toll calls are priced above the costs of providing that service to their customers. Thus a reduction in toll support may result primarily in a redistribution of payments among the company's own customers rather than a reduction in support provided by the customers of other companies.

Payments into the pool are based on the amount of revenue from interstate toll calls billed by the local telephone company. This billing is based on uniform, nationwide toll rates and is not related to local costs. Those states that allocate a higher than average amount of subscriber plant costs to interstate traffic tend to draw more out of the pool than they pay in. The data in Table 4 summarize payments into and out of the interstate toll pool associated with subscriber plant costs in 1982. For example, \$114 million of subscriber plant costs from the state of Nevada was allocated to the interstate toll pool. Nevada customers paid \$97 million into the toll pool toward the support of those costs. During 1982, there were

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3. Independent companies reflect an even wider range. Some small telephone companies are currently able to allocate as much as 85 percent of their subscriber plant costs to interstate service.

TABLE 3. BELL SYSTEM SUBSCRIBER PLANT COSTS FOR 1981 AND INTERSTATE ALLOCATION OF SUBSCRIBER PLANT COSTS PER SUBSCRIBER LINE PER MONTH

Local Bell Company	Subscriber Plant Costs (In dollars) <u>a/</u>	Percentage Allocated to Interstate (SPF)	Amount Allocated to Interstate (In dollars)
Alabama	32	20.8	7
Arizona	28	42.6	12
Arkansas	33	28.8	9
California	27	24.0	6
Colorado	30	42.2	13
Connecticut	23	33.4	8
Delaware	24	34.0	8
District of Columbia	23	41.9	10
Florida	35	36.2	13
Georgia	31	28.5	9
Idaho-Mountain Bell	27	35.3	9
Idaho-Pacific Northwest Bell	28	37.8	11
Illinois	22	26.4	6
Indiana	24	23.1	6
Iowa	25	28.2	7
Kansas	27	29.8	8
Kentucky-South Central Bell	32	20.3	7
Kentucky-Cincinnati Bell	22	13.0	3
Louisiana	34	19.9	7
Maine	25	29.9	7
Maryland	23	21.1	5
Massachusetts	23	27.5	6
Michigan	24	16.9	4
Minnesota	25	26.6	7
Mississippi	36	25.0	9
Missouri	25	26.3	7
Montana	27	44.5	12
Nebraska	27	36.9	10
Nevada	42	62.1	26
New Hampshire	28	43.0	12
New Jersey	22	31.5	7

(Continued)

TABLE 3. (Continued)

Local Bell Company	Subscriber Plant Costs (In dollars) <u>a/</u>	Percentage Allocated to Interstate (SPF)	Amount Allocated to Interstate (In dollars)
New Mexico	27	36.0	10
New York	27	27.4	7
North Carolina	28	24.1	7
North Dakota	30	32.4	10
Ohio-Ohio Bell	23	19.0	4
Ohio-Cincinnati	23	18.7	4
Oklahoma	26	31.8	8
Oregon	27	32.8	9
Pennsylvania	20	21.1	4
Rhode Island	22	28.4	6
South Carolina	32	22.0	7
South Dakota	28	36.2	10
Tennessee	27	22.2	6
Texas-Southwestern Bell	30	22.6	7
Texas-Mountain Bell	21	33.0	7
Utah	24	31.4	8
Vermont	29	43.9	13
Virginia	26	26.7	7
Washington	24	30.1	7
West Virginia	32	21.5	7
Wisconsin	21	21.7	5
Wyoming	45	56.5	25
System Average	26	26.0	7

SOURCE: Federal Communications Commission, Common Carrier Docket No. 78-72, Phase 1; Comments of the Bell Operating Companies (August 6, 1982).

- a. Subscriber plant costs include inside wiring and customer premises equipment. A state-by-state breakdown of subscriber plant costs associated with providing only local loops is not available. The monthly average fixed cost per subscriber (\$26) is substantially more than the average monthly charge for residential service. Revenues to pay remaining fixed costs, as well as variable costs, are generated through a combination of interstate toll charges, intrastate toll charges, and charges for other services such as private lines or leased facilities.

TABLE 4. INTERSTATE SEPARATIONS AND SETTLEMENTS FOR 1982
(In millions of dollars)

State	Total Subscriber Plant Costs Allocated to the Interstate Jurisdiction (A)	Customer Payments For Subscriber Plant Costs Allocated to the Interstate Jurisdiction (B)	Ratio (A ÷ B)
Alabama	121	128	.95
Alaska	40	23	1.74
Arizona	214	150	1.43
Arkansas	100	81	1.24
California	1,142	862	1.33
Colorado	240	213	1.13
Connecticut	151	205	.74
Delaware	30	43	.70
District of Columbia	87	118	.74
Florida	863	600	1.44
Georgia	255	266	.96
Hawaii	40	56	.71
Idaho	65	48	1.35
Illinois	431	504	.86
Indiana	183	187	.98
Iowa	106	108	.98
Kansas	119	105	1.13
Kentucky	99	106	.93
Louisiana	144	152	.95
Maine	45	39	1.15
Maryland	126	203	.62
Massachusetts	218	296	.74
Michigan	214	250	.86
Minnesota	155	149	1.04
Mississippi	92	82	1.12
Missouri	190	209	.91
Montana	64	38	1.68
Nebraska	84	78	1.08
Nevada	114	97	1.18

(Continued)

TABLE 4. (Continued)

State	Total Subscriber Plant Costs Allocated to the Interstate Jurisdiction (A)	Customer Payments For Subscriber Plant Costs Allocated to the Interstate Jurisdiction (B)	Ratio (A ÷ B)
New Hampshire	68	67	1.02
New Jersey	351	548	.64
New Mexico	81	68	1.19
New York	843	848	.99
North Carolina	191	205	.93
North Dakota	38	33	1.15
Ohio	271	336	.81
Oklahoma	168	156	1.08
Oregon	155	121	1.28
Pennsylvania	300	453	.66
Puerto Rico	60	23	2.61
Rhode Island	37	49	.76
South Carolina	108	124	.87
South Dakota	37	29	1.28
Tennessee	138	184	.75
Texas	616	567	1.09
Utah	60	67	.90
Vermont	40	31	1.29
Virginia	214	262	.82
Virgin Islands	10	5	2.00
Washington	224	187	1.20
West Virginia	60	66	.91
Wisconsin	148	152	.97
Wyoming	70	43	1.63
Total	10,020	10,020	1.0

SOURCE: Centel Corporation.

NOTE: The data in this table include all companies, while those in Table 3 include only the Bell system.

approximately 450,000 subscribers in Nevada (measured in the number of access lines provided). Thus, while toll support averaged \$21 per month per customer, toll payments averaged \$18 per month and the net support was \$3 per month. ^{4/}

The practice of overpricing toll calls in order to reduce basic monthly charges does result in some transfer of funds among areas, but the pattern seems difficult to characterize. To the extent cross subsidies do exist, they flow not so much among areas as from toll users to nontoll users. But beyond that generalization, there is little agreement on who subsidizes whom. ^{5/}

THE DECISION TO CHANGE THE PRESENT SYSTEM OF TOLL SUPPORT

By the late 1970s, competitive carriers (such as MCI) were seeking to use the facilities provided by local telephone companies to originate and terminate their own long-distance traffic. Also by that time, about half of the revenue generated from traditional long-distance telephone service was being used to pay for local subscriber plant. If new competitive long-distance carriers were allowed to use local facilities without making a contribution towards the costs of subscriber plant equal to that provided by conventional long-distance traffic, they would enjoy a significant competitive advantage. In addition, the vulnerability of the traditional telephone industry to competitive entry in major long-distance markets was increased by the practice of "averaging" interstate rates and charging the same rates in all markets of equal distance regardless of the costs involved, since rate averaging led to rates set above costs in major markets.

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4. The data in Table 4 include all companies while the data in Table 3 are restricted to the Bell system. Because independent telephone companies provide a majority of Nevada's service, the toll support figure cited here (\$21 per month) differs from that presented earlier for Nevada Bell (\$26).
 5. It is unclear, for example, whether business subscribers subsidize residential customers. Business customers pay fixed monthly charges that are higher than those paid by residential customers; on the other hand, most long-distance calls made by businesses are made on private lines leased from telephone companies (which are not included in the separations and settlements process and therefore are not overpriced as are normal long-distance toll calls), on WATS lines (at substantial bulk rate discounts), and on private communications systems.

Litigation and proceedings at the FCC established the right of new long-distance carriers to interconnect with the facilities of local phone companies. An interim agreement, entered in 1978, established the principle that, although new carriers would make some contribution toward the payment of subscriber plant costs, they would pay less per minute of usage than would AT&T's Long Lines Department. ^{6/}

In 1978, the FCC began a comprehensive examination to consider such questions as whether a competitive long-distance market was desirable and, if so, how it might be achieved. ^{7/} In 1980, the FCC concluded that the public interest was best served by competition. ^{8/}

Fostering competition in the long-distance market was complicated by the fact that the largest long-distance carrier (AT&T with 95 percent of the market) also provided local service for 80 percent of the nation's customers. Hence, both the FCC and competitors worried that the Bell Operating Companies might favor AT&T's Long Lines Department. ^{9/} For a competitive long-distance market to be workable, competing long-distance carriers had to obtain "access" to the customers served by local telephone companies. Thus, the FCC announced that it would develop a system of "access charges" to compensate local telephone companies for the use of their facilities to complete long-distance calls.

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6. The agreement, subsequently filed as a tariff, is called Exchange Network Facilities for Interstate Access or "ENFIA." The differential price was based on the principle that the access provided to competitive carriers was not equal in quality nor as convenient to use as that provided to Long Lines. See Appendix A for a detailed discussion.
 7. Federal Communications Commission, Common Carrier Docket 78-72, MTS and WATS Market Structure, Notice of Inquiry and Proposed Rulemaking, 67 FCC 2d 757.
 8. Federal Communications Commission, Common Carrier Docket 78-72, Third Supplemental Notice, 81 FCC 2d 177.
 9. The FCC's examination of the long-distance market began before the agreement by AT&T to divest its operating companies. The problem of equal treatment for competing long-distance carriers was compounded by the fact that the telephone system had been engineered so that AT&T's Long Lines received connections of superior quality to the competitors (for example, Long Lines received "trunk side" connections designed for long-distance service while the competitors received connections designed for ordinary business customers).

After extensive proceedings, the FCC issued its access charge decision in December 1982. ^{10/} The FCC decision requires that the traditional system of pooling and sharing interstate toll revenues be terminated. It will be replaced with a new system in which each local telephone company recovers its own costs through a series of access charges. In January 1984, the commission announced that access charges would not be applied to residential or single-line business subscribers until June 1985. In addition, the commission directed its staff to make a number of revisions to its previous decision, including the development of a program to exempt subscribers who might not be able to afford access charges. ^{11/} Access charges paid by multiline business customers became effective on May 25, 1984.

Ultimately, subscribers will pay access charges, in the form of fixed monthly fees, that will compensate the local phone company for part of the subscriber plant costs that the company allocates to interstate service. ^{12/} Long-distance carriers will pay access charges based on the volume of interstate traffic that the local company originates or terminates for the long-distance carrier. The access charges paid by long-distance carriers will compensate the local company both for traffic sensitive costs, such as switching, and for subscriber plant costs not recovered directly from subscribers. Over time, the proportion of fixed costs paid by subscribers will rise and the proportion paid by long-distance carriers will decline. By 1990, local companies will recover most of the fixed costs that they now allocate to interstate service through the use of subscriber access charges. ^{13/}

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10. Federal Communications Commission, Common Carrier Docket 78-72, Third Report and Order, adopted December 22, 1982, released February 28, 1983. Subsequently, the FCC modified and simplified the transition provisions of the order. Docket 78-72, Memorandum Opinion and Order, adopted July 27, 1983, released August 22, 1983.
 11. Federal Communications Commission, Press Release, "FCC Delays Two Dollar Charge," January 19, 1984.
 12. The FCC calls this charge a customer access line charge (CALC), a customer line charge, or end-user charge.
 13. Technically, subscriber access charges will recover only the fixed costs associated with providing the local loop. Fixed costs associated with inside wiring and terminal equipment will continue to be recovered by access charges paid by long-distance carriers. By 1990, however, most of the costs associated with terminal equipment and inside wiring will have been phased out of the rate base.

Under the FCC's access charge rules, charges imposed on long-distance carriers will pay for traffic sensitive costs and also generate revenues to finance a "Universal Service Fund" designed to assist local phone companies with unusually high fixed costs. Thus, over a period of time, the current practice of recovering fixed costs through interstate toll revenues will be largely eliminated.

The FCC reached its decision to replace the present system of sharing toll revenues for four reasons: efficiency, discrimination, bypass, and universal service.

Efficiency. Because subscriber plant costs do not vary with the amount of usage, it is inefficient to charge callers on the basis of usage. In the commission's view, since the marginal costs of using the local loop are zero, the price should also be zero. This view was based on the concept that prices set above marginal costs are not desirable in terms of economic efficiency. Thus, charging a high price to use a local loop in order to complete a long-distance call discouraged toll usage and resulted in an overall loss to consumers. ^{14/}

Discrimination. Telephone subscribers who made few long-distance calls did not make payments equal to the full costs of services provided to them. This occurred because a share of the subscriber plant associated with serving these customers was classified as interstate, allocated to that jurisdiction, and recovered from long-distance calls. In contrast, persons who made a large volume of long-distance calls made payments that far exceeded the costs incurred in providing service to them. In itself, this situation did not necessarily represent illegal discrimination so long as each customer paid the same price per unit of service. However, different prices were often charged for identical services or facilities. Thus, a particular line might be leased as a private line, used as a WATS line, or provided as an ordinary business line. In the FCC's view, charging different prices under different tariffs for the same service represented illegal discrimination.

Bypass. The pricing of long-distance services above their direct costs in order to raise a contribution to pay a portion of the costs of local sub-

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14. The National Telecommunications and Information Administration has estimated that overcharging long-distance callers and undercharging local callers results in a net loss to consumers of \$1.6 billion annually. Federal Communications Commission, Common Carrier Docket 80-286, Comments of the National Telecommunications and Information Administration, Appendix D, August 17, 1981.

subscriber plant increased the incentives for high-volume users to seek lower-cost alternatives. For large customers, there were at least three ways to "bypass" the support provided for local rates. First, a network of "private lines" could be leased from telephone companies. Private lines were not included in the normal separations and settlements process and these facilities did not provide a contribution towards paying the costs of subscriber plant. Second, using new technology, large telecommunications users can use private systems to satisfy many of their telecommunications needs. Finally, many large customers can simply bypass long-distance charges by using the subscriber plant provided by local telephone companies in combination with the user's own switching and long-distance transmission facilities. ^{15/} The FCC was concerned that prices not related to costs would induce what it termed "uneconomic bypass" (the construction and use of private facilities that were less efficient than facilities provided by the telephone industry but that were also less costly because they were not required to generate support to pay for local subscriber plant). The FCC decided that uneconomic bypass was an immediate and serious threat and that, once users made investments to bypass the conventional telephone system, it would be difficult or impossible to recapture those customers.

Universal Service. The commission decided that it had a statutory mandate to promote the widespread availability of telephone service. It believed that, in the long run, this could best be provided by ensuring that prices were related to costs. In the FCC's view, attempts to overcharge toll users in order to promote lower residential rates would ultimately be counterproductive since doing so would provide incentives for uneconomic bypass. The ultimate fear was that the largest customers would desert the conventional telephone network, leaving smaller customers to defray the entire costs of the system at much higher rates than if the larger customers had remained, and that the resulting rates would be so high as to reduce the widespread availability of service.

Initially, subscriber access charges have been imposed only on business customers that require more than one telephone line. Such subscribers pay

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15. The situation in which a long-distance call travels over private facilities or leased lines to a corporate switchboard and then over local distribution facilities is known as the "leaky PBX problem." In such cases, long-distance calls that use local subscriber plant are not identified as long-distance calls.

monthly access charges of up to \$6.00 per line. ^{16/} Monthly access charges will be paid by residential customers and single-line business customers beginning around June 1985. Although the initial level of such charges has not yet been determined, the FCC has indicated that they will be phased in gradually and will not exceed \$4.00 monthly until at least 1990. The difference between the amounts collected from access charges imposed directly on subscribers and the amount of total subscriber plant costs allocated to interstate service will be recovered by charges on long-distance services. ^{17/} During 1986, the FCC will conduct a review and make any necessary adjustments to the new system. Although subject to change, the FCC has laid out a plan for shifting remaining interstate subscriber plant costs from carriers to end users during the years 1987, 1988, and 1989.

CHANGES IN THE ALLOCATION OF COSTS: THE JOINT BOARD DECISION

In June 1980, the FCC established a federal-state joint board to recommend the manner in which subscriber plant costs should be separated between the interstate and intrastate jurisdictions. ^{18/} Thus, at the same time the access charge proceeding was considering how fixed costs allocated

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16. Under the commission's transition rules, no charge imposed during the transition may exceed the charge that would be ultimately imposed if the transition were completed. Some local companies with low subscriber plant costs will not be able to justify monthly charges as high as \$6.00. For example, Bell of Pennsylvania has filed an access charge for business customers of \$2.90.
 17. Most of the money from long-distance service will come from a charge of several cents per minute on long-distance calls, which the FCC calls a "carrier's common line charge." A smaller amount of money will be raised by a monthly charge of \$25 levied on private lines that provide services substitutable for conventional long-distance calls but that have not traditionally paid a contribution toward the costs of subscriber plant. For example, leased lines between major corporate offices may handle large volumes of long-distance messages but have traditionally not paid a contribution toward local fixed costs similar to that paid by conventional long-distance calls.
 18. Federal Communications Commission, Common Carrier Docket 80-286, Amendment of Part 67 of the Commission's Rules and Establishment of a Joint Board, 78 FCC 2d 837.

to the interstate jurisdiction should be recovered, a parallel proceeding was addressing the issue of **what** costs should be allocated to the interstate jurisdiction. ^{19/} In accordance with Section 410(c) of the Communications Act, a joint board consists of four state public utility commissioners and three members of the FCC. Technically, a joint board simply makes recommendations to the commission and the commission takes final action. In practice, the FCC almost invariably accepts the recommendations of a joint board on such issues as separating costs.

In April 1983, the joint board announced the outlines of its long-term recommendations, and, with minor exceptions, the recommendations were adopted by the FCC on December 1, 1983. ^{20/} The present system of dividing subscriber plant costs between intrastate and interstate jurisdictions will continue during 1984 and 1985. Beginning in 1986, the industry will begin a transition to a new method of allocating subscriber plant costs associated with providing the local loop. (The new allocation method will not apply to customer premises equipment (CPE) or to inside wiring.) For most companies, the transition will occur during 1986, 1987, and 1988.

Some companies--those with unusually high dependence on interstate toll revenues--will be allowed a slightly longer transition time. The new method of allocation will not be related to measures of use. Instead, most companies will simply allocate 25 percent of their loop costs to the interstate jurisdiction and 75 percent to the intrastate jurisdiction. Companies with subscriber loop costs above 115 percent of the national average will allocate a proportion of all costs above that level to a new account called the "high-cost category." The higher a company's costs, the larger the proportion that is assigned to the high-cost category. All loop costs above 250 percent of the national average will be allocated to the new high-cost category. The new cost-allocation procedures are explicitly designed to mesh with the new cost-recovery procedures: high costs allocated to the

19. The current set of rules that are to be amended are contained in National Association of Regulatory Utility Commissioners, Separations Manual: Standard Procedures for Separating Telephone Property Costs, Revenues, Expenses, Taxes and Reserves (February 1971).

20. Federal Communications Commission, Common Carrier Docket 80-286, Second Recommended Decision and Order, released September 26, 1983.

high-cost factor will be recovered from the Universal Service Fund established during the access charge proceeding. 21/

For the industry as a whole, approximately as many costs will be assigned to the interstate jurisdiction by the new allocation procedures as are assigned there today. For individual companies, however, the proportion of costs currently assigned to the interstate jurisdiction varies widely. Some small companies now allocate as much as 85 percent of their subscriber plant costs to the interstate jurisdiction. For such companies, the new allocation system will mean fewer costs allocated to the interstate jurisdiction and the need to recover additional revenues from intrastate sources. For companies with high fixed costs, the reduced revenues from interstate toll services will be partially offset by payments from the new Universal Service Fund.

THE IMPACT OF ALLOCATION AND RECOVERY CHANGES ON RATES

For subscribers who make long-distance calls, increases in monthly bills resulting from access charges will be partially offset by lower long-distance rates. Subscribers who make a large number of long-distance calls will see their total bills decrease.

In the years after 1986, access charges will increasingly differ from local company to local company. In 1990, when the transition period is complete, each telephone subscriber--whether business or residential--will pay a monthly charge to his local telephone company reflecting the local loop costs allocated to the interstate jurisdiction (and previously collected from interstate long-distance traffic).

If no transition period were involved and the change had been implemented entirely in 1982, the average monthly subscriber access charge

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21. The new allocation method was also designed to fit in with the new system of access charges in other ways. For example, the new allocation procedures apply only to that portion of subscriber plant costs associated with providing local loops. Those costs, under the access charge decision, will be recovered through subscriber access charges. Traditional allocation methods, based on relative use, will continue to be applied to inside wiring and CPE costs. Under the access charge decision, CPE and inside wiring costs will be recovered through use-related access charges imposed on long-distance carriers.

would have been about \$5.00. ^{22/} At the same time, interstate toll rates for 1982 might have been reduced by 30 percent to reflect the elimination of toll support for local rates.

The term access charge is unfortunate and has led to some confusion. It is regarded by many as a new cost for access to long-distance service. In fact, it simply represents a new method by which local telephone companies recover a portion of their fixed costs that have previously been recovered through interstate toll revenues.

Most local telephone companies that currently allocate a large proportion of their subscriber plant costs to the interstate jurisdiction will no longer be able to do so when new procedures for allocating costs are phased in. ^{23/} This will mean that the amount of revenue they must raise from intrastate sources (including local rates) will rise. Thus, subscribers of those companies may eventually face local rate increases in addition to access charges. The size of any such increases are impossible to determine at this time, although "worst case" scenarios might be constructed. ^{24/}

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22. The average reflects total loop costs of \$24 billion, with \$6 billion allocated to the interstate jurisdiction and about 100 million access lines.
 23. Some small companies with extraordinarily high costs may benefit from the new allocation procedures because they will be able to assign 100 percent of all costs above a certain level to the high-cost factor and recover those costs from the Universal Service Fund while the maximum amount they can currently allocate to interstate service is 85 percent.
 24. Whether or not the new allocation procedures will result in additional fixed costs being allocated to intrastate services will differ from company to company. The result for each company will depend on that company's level of subscriber loop costs in relation to industry averages and on the proportion of fixed costs that the company is currently able to allocate to interstate service. The worst result would be experienced by a company that is currently able to allocate 85 percent of its fixed costs to interstate service and that has subscriber loop costs exactly 250 percent of the national average. Had the new allocation procedures been implemented fully in 1982, such a company would have experienced an increase in costs allocated to intrastate service of approximately \$13.70 per subscriber line per month. These calculations are based on formulas adopted by the FCC

Two concerns have been expressed about higher monthly charges resulting from changes in the allocation and recovery of subscriber plant costs: that widespread availability of telephone service may be jeopardized and that higher rates may impose a hardship on many individuals. These concerns are discussed in Chapters III and IV.

24. (Continued)

in December 1983. Subsequently, in January 1984, the FCC instructed its staff to gather comments on methods that would provide more financial assistance to small telephone companies and substantially reduce the impact on them.

CHAPTER III. THE AVAILABILITY OF TELEPHONE SERVICE AND THE POTENTIAL IMPACT OF RATE CHANGES

The concept that telephone service should be widely available is usually referred to as universal service. Government action to ensure this service is often supported for three reasons:

- o **Network Considerations.** Each additional subscriber increases the value of the telephone system to other subscribers. This occurs because a larger telephone network provides the opportunity for each subscriber to communicate with a larger number of other individuals. Government actions to increase subscribership are often justified in terms of increasing the value of the network. ^{1/}
- o **Contribution to Society.** Proponents of universal service claim that phone service is necessary to bind society together. They draw an analogy to the roadway network, and contend that a network is essential whether or not all parts are self-sufficient.
- o **Importance to Individuals.** Telephone service is sometimes viewed as a necessity to individuals (rather than to society as a whole) and it is argued that, in a humane society, no citizen should be deprived of the availability of telephone service. Arguments along these lines usually stress local service and the ability of the poor and elderly to reach emergency numbers or to call a doctor.

Although the goal of universal service does not appear specifically in the language of the Communications Act of 1934, it is widely accepted. In its access charge decision, the FCC decided that universal service had existed for several years and that the commission was responsible for ensuring that such service continued.

Since World War II, when fewer than half the nation's homes had telephones, service has become so widespread that 95 percent of all

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1. In economic jargon, the concept that an individual's decision to subscribe to service also provides benefits to other subscribers is often called an "externality."

residences now have at least one telephone. At the same time, the quality of service has improved dramatically: conversion to dial service was completed, direct distance dialing became widely available, and one-party service became the industry standard. More and more subscribers added extensions (even before prices were reduced with the introduction of competition into the terminal equipment market), and most subscribers purchase flat-rate service rather than measured service. The development of universal service occurred during a period in which the price of service was falling in real terms, consumer incomes were rising, and assistance was provided to many small companies through the Rural Electrification Administration (REA). ^{2/}

Concern that the recent FCC decisions will reduce the widespread availability of telephone service relates to the price elasticity of demand for service--the concept that higher local rates might cause many persons to forego telephone service. The price elasticity of demand for telephone service has been extensively studied, and there is general agreement that demand is quite inelastic--that is, most subscribers will continue service even if prices increase. ^{3/} Some of the most extensive research, and certainly the most widely used, has been conducted by Lewis J. Perl. Depending on the statistical model used, Dr. Perl estimated long-run price elasticities of demand for basic residential service ranging from $-.07$ to $-.09$. ^{4/} Thus a 10 percent increase in monthly service charges, all other things being equal, would be associated with a decrease in the number of households subscribing to service ranging from 0.7 to 0.9 percent. This decrease is less than that found for many other products and services, such as energy.

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2. See Appendix B for information on the development and geographic availability of service. Also see Table B-3 for prices of telephone service in real terms.
 3. See Lester D. Taylor, Telecommunications Demand: A Survey and Critique (Cambridge, Massachusetts: Ballinger Publishing Company, 1980). This study contains a comprehensive review of previous empirical studies.
 4. Perl's results were introduced at the AT&T antitrust trial, reproduced by the FCC as part of an appendix in its access charge order, and cited by numerous witnesses in Congressional hearings. More recent research has been undertaken by Dr. Perl for the Central Services Organization of the Bell Operating Companies. His latest study, using 1980 rather than 1970 data, finds demand even less sensitive to price than his earlier studies. Lewis J. Perl, Residential Demand for Telephone Service, 1983, (White Plains, New York: National Economic Research Associates, December 16, 1983).

The percentage of households having service, often called the "penetration rate," is not perfect as a measure of the availability of phone service. Some people may consider service to be reasonably available even though they do not have a telephone in their residence--through use of a phone at work, in the hall or lobby of an apartment building or dormitory, through good access to a neighbor's phone, or through a nearby pay telephone. For these reasons, changes in the level of telephone penetration may overstate changes in the availability of service. Nevertheless, penetration remains the measurement frequently used in debate over the possible impact of rate changes and the effects of access charges on penetration are analyzed below.

During 1983, the average residential telephone bill was about \$11.00 for basic local service. In addition, the average household paid an additional \$3.00 in taxes; \$18.00 in long-distance charges; and \$6.00 for equipment rental and services, such as pulse dialing and extended area service. The average total monthly bill was about \$38.00.^{5/} If a \$2.00 access charge were added to the \$11.00 basic rate, the price of basic service would increase 18 percent. A price elasticity estimate of -.09 would suggest that 1.6 percent of the nation's households would terminate telephone service. Estimates such as this were presented by a variety of witnesses at Congressional hearings on the FCC decisions, as were estimates based on larger price increases that showed larger numbers of households terminating service.

These estimates, however, are likely to overstate the impact for several reasons. First, the elasticity estimates used are estimates of long-run elasticity with respect to "pure" price changes--that is, they assume all other factors remain unchanged. But, in fact, a variety of other developments are occurring at the same time. These include reductions in long-distance rates, the proliferation of new telephones available in the deregulated

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5. These statistics reflect Bell system averages provided to the FCC. Federal Communications Commission, Common Carrier Bureau, Analysis of the Effects of Federal Decisions on Local Telephone Service (December 9, 1983), Attachment 14. Because the Bell system serves 80 percent of the nation's subscribers, industry averages would be close to these amounts. Independent telephone companies, which serve smaller exchanges, tend to have average residential billings that are somewhat lower than the Bell system and average long-distance billings that are higher.

lated equipment market, and rising consumer incomes, all of which tend to increase the desirability of subscribing to telephone service.

Second, most elasticity studies have not taken into account the options for consumers to switch to another type of service. Most subscribers do not purchase the minimum grade of available service and the average household spends about \$6.00 per month on enhanced equipment and services. Therefore, most households can adjust the "package" of services purchased and pay less, rather than discontinue service. In fact, after including variables for the quality of service, Mahan was unable to find any statistically significant elasticity of demand for basic service. ^{6/}

Third, access charges are to be imposed on a per line basis. Thus, subscribers who purchase multiparty service will share access charges. This will affect relatively few subscribers since about 95 percent of all subscribers have single-party service. It may, however, be important to those who choose multiparty service because of limited incomes.

In 1982, the average business subscriber paid about \$55.00 per line per month for local service. ^{7/} Access charges of up to \$6.00 per month were imposed on multiline business subscribers beginning in May 1984. Because business subscribers are believed to have less elastic demand than residential subscribers, the percentage of businesses terminating service should be less than 1 percent. Further, since the charges will apply only to businesses receiving multiline service, many subscribers may respond by reducing the number of lines used rather than terminating service.

Previous experience with rate changes also provides some insight into the impact of access charges on subscribership. Until 1980, the price of local telephone service generally increased at a slower rate than the Consumer Price Index (CPI). During 1981 and 1982, however, increases in the price of local service began to exceed increases in the general rate of inflation. During those two years, the average price of basic service provided to residential customers increased about \$2.00. In each of these two years, the number of residential subscribers increased. Given this

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6. Gary P. Mahan, The Demand for Residential Telephone Service (The Institute of Public Utilities, Graduate School of Business Administration, Michigan State University, 1979).
 7. This includes basic service, equipment, and enhancements. No breakdown among the categories is available.

experience, it is likely that changes in the number of subscribers resulting from residential access charges of \$2.00 would be difficult to detect. 8/

If local telephone rates had increased at the same pace as the overall Consumer Price Index during the years since 1967, the average residential monthly charge would be several dollars higher than it now is. A price increase of about \$4.00 per month would be required to make the real price of local service equal that charged in 1967. Since access charges will not exceed \$4.00 until at least 1990, the use of access charges will not lead to local rates--adjusted for inflation--that are higher than rates charged in the late 1960s. This too indicates that large numbers of subscribers are unlikely to discontinue service because of access charges. 9/

If the access charge system is fully implemented in 1990, subscriber access charges will average \$5.00 (in 1982 dollars). This level of change in the price of local service and use of the same elasticity estimates as above would lead to estimates that the number of households subscribing to service might decline by 4 percent. Again, however, such estimates would overstate the actual decline for the reasons discussed earlier.

The implementation of access charges is unlikely to have any measurable impact on the CPI. This is because the charges represent a change in the method of cost recovery rather than an increase in total expenditures for telephone service. That is, higher consumer expenditures for local telephone service will be largely offset by lower expenditures for long-distance service. In addition, the impact of any changes would be small because telephone service represents only a small portion (about 1.5 percent) of the goods and services upon which the CPI is based.

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8. Prior to the FCC's action of January 19, 1984, \$2.00 monthly access charges would have been imposed on residential subscribers beginning in April 1984. Charges on residential and single-line business customers are not now scheduled until June 1985 and their level has not yet been set. In view of the FCC's announcement that it was imposing a slower transition, and that charges would not exceed \$4.00 monthly by 1990, it seems likely that initial charges in mid- or late 1985 may well be less than \$2.00 monthly.
 9. From a base of 100 in 1967, the Consumer Price Index increased to 298 in 1983. The Telephone Rate Index for local rates maintained by AT&T increased during that same period from a base of 100 to 218.

Some telephone companies will not do as well under the new method of allocating costs as under the traditional system. Companies that have high subscriber loop costs and that are currently able to allocate a large share of those costs to interstate service will need to raise additional revenues from intrastate sources (including local rates). Thus, customers of some small companies may eventually face higher local rates to offset revenues lost from the new allocation system, as well as subscriber access charges. Relatively few subscribers are served by companies with unusually high fixed costs, however, and less than 1 percent of the nation's subscribers are served by companies with local fixed costs that exceed twice the national average. ^{10/} In addition, many of the companies involved are eligible for assistance under REA programs.

Should the Congress seek to address the problems of those subscribers who face unusually large rate changes, the problem is complicated by the fact that many companies with high subscriber loop costs do not have high average total costs. Companies in rural areas may have higher than average investments in subscriber plant (reflecting the need to string wires to serve sparsely populated areas). Many such companies, however, are apparently able to offset these costs with lower wages and greater productivity. ^{11/} Therefore, many rural companies actually have low average total monthly costs per subscriber. An efficient program to aid those subscribers adversely affected by the combination of decisions to change the allocation and recovery of subscriber plant costs would need to be carefully constructed because attempts to provide assistance to all rural areas would provide assistance to many low-cost companies not actually in need of assistance.

10. Prior to the January 19 announcement to delay residential access charges, FCC rules would have set the maximum subscriber access charge at twice the national average. Thus the highest access charge faced by any subscriber would have eventually been about \$10.00 (in 1982 dollars). Given the FCC's announced intention to provide additional assistance to high-cost companies and to ensure that residential access charges do not exceed \$4.00 by 1990, the new maximum residential access charge will probably be \$4.00.

11. Appendix C contains an analysis of service costs in rural areas.

CHAPTER IV. ALTERNATIVE APPROACHES TO ALLEVIATE HARDSHIPS FROM HIGHER RATES

Of the many factors simultaneously affecting local telephone rates, the Congress could most easily change the FCC's decision to reduce the level of toll support currently provided for local rates. The FCC's access charge decision will result in greater economic efficiency and lower long-distance rates as prices become more closely related to the costs of services provided. At the same time, however, the decision will result in higher fixed monthly charges for telephone subscribers. Although relatively few subscribers are likely to discontinue service because of the higher fixed charges, those low-income individuals who make few long-distance calls may consider the increased cost a hardship. This balance between efficiency and possible hardships is the central issue arising from the FCC decision.

Access charges for businesses that use more than one telephone line began on May 25, 1984. Access charges for residential and single-line business customers are scheduled to begin in June 1985. Although final rules will not be determined until December 1984, the FCC has announced its intention to limit subscriber access charges to no more than \$4.00 monthly until 1990 and to seek methods of providing assistance to individuals and small telephone companies adversely affected by access charges. 1/

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1. Five separate proceedings will be conducted: "(1) a further rulemaking to devise exemptions or target assistance for subscribers who may not be able to afford end user charges; (2) a further inquiry into the effects upon universal service of end user charges as well as federal decisions in general; (3) a further inquiry to compile more detailed data upon the extent and dangers of bypass; (4) a further rulemaking to adopt more effective mechanisms to meet the needs of smaller telephone companies for more assistance; and (5) a further rulemaking to examine how best to implement an end user charge for residential and single line business customers." Federal Communications Commission, News Release, "Commission Affirms Decision to Delay Two Dollar End User Charges" (January 25, 1984). The commission directed its staff to attempt to complete these proceedings by December 1, 1984, so that any new arrangements could be put in place by June 1985.

CONGRESSIONAL LEGISLATION

At the time of the commission's decision to delay access charges for residential and small business subscribers, two major legislative proposals were before the Congress. Each addressed the balance between the gains in economic efficiency that might be achieved through access charges and the hardships that might be imposed on subscribers. H.R. 4102 was passed by the House of Representatives on November 10, 1983; and S. 1660 was approved by the Senate Commerce Committee on September 30, 1983.

After the FCC's January 19, 1984, decision to delay subscriber access charges, the Senate tabled S. 1660 and postponed further consideration indefinitely. Although the bill remains on the Senate calendar and may be considered again this year, it now seems likely that further Congressional action will await the 99th Congress. Nevertheless, the current bills represent a principal point of departure for any future Congressional action on the FCC decisions. Thus, this chapter begins with a review of the current legislation. Table 5 summarizes the original FCC decision, the modifications adopted January 19, and the parts of the current Senate and House bills that most directly affect access charges paid by subscribers. ²/ Alternative approaches that the Congress might wish to consider in any further action follow this section on legislation.

The House Bill

Major Provisions. The centerpiece of H.R. 4102, the Universal Telephone Service Preservation Act of 1983, is the prohibition of access charges on residential and single-line business subscribers. Most of the fixed costs of local telephone companies that are currently recovered from interstate toll revenues would continue to be recovered from that source.

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2. Both bills contain other provisions as well. Local companies currently receive a higher rate of compensation from AT&T's long-distance services than from competing carriers. H.R. 4102 would generally maintain this differential until all long-distance carriers receive equal access to local facilities (see Appendix A). In addition, H.R. 4102 would reverse a recent FCC decision requiring state regulatory authorities to use the same depreciation schedules as the FCC for facilities jointly used to provide interstate and intrastate services; allow the FCC to provide financial assistance for public participation in FCC proceedings; establish associations of residential telephone subscribers in each state; and provide protection to employees affected by the AT&T divestiture. S. 1660 would require rates for service to Hawaii and Alaska to be integrated with other interstate rates.

Recognizing that higher-than-cost rates for long-distance services provide incentives for large telecommunications customers to switch to private facilities, the House bill would require the FCC to establish special access charges for private lines and other facilities that might "leak" traffic into the local telephone network without paying the fixed costs embedded in standard long-distance charges. ^{3/} In addition, private systems that are not connected with local telephone facilities would pay charges to help defray the costs of local phone companies. The rationale for this provision is that local phone companies provide backup capacity in the event that private systems become overloaded, and hence benefit the owners of these systems.

The House bill, like the FCC proposal, would require that surcharges be imposed on long-distance calls in order to create a Universal Service Fund. Under either proposal, the Universal Service Fund would be used to assist companies with high fixed costs. The House proposal, however, would provide a higher level of assistance to small companies while large companies would be ineligible for such assistance unless their costs were unusually high. Under the House bill, about \$550 million of assistance would have been provided to small companies with high costs if the program had been in effect during 1984. In contrast, the somewhat lower level of assistance provided to all companies with high costs under the FCC proposal would have amounted to about \$900 million. ^{4/}

Lifeline service (telephone service offered at rates below costs to low-income individuals) would be required in each state. Losses from the provision of lifeline service would be partially paid with funds from the Universal Service Fund, with local telephone companies recovering the remainder from other services. Universal Service Fund costs to support lifeline service are estimated to be about \$680 million annually. ^{5/}

The House legislation also would establish a Universal Service Board, composed of five FCC commissioners and four state regulators. The new panel would oversee the operation of the Universal Service Fund and decide

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3. The FCC access charge decision would impose similar charges temporarily. Under the FCC's approach, these charges (along with contributions toward fixed costs currently received from conventional long-distance calls) would be replaced by fixed monthly charges paid directly by subscribers.
 4. Universal Telephone Service Preservation Act of 1983, H. Rept. 98-479, 98 cong. 1 sess. (1983), page 51.
 5. This estimate was based on participation by 11.3 million households, and the House report regards this as a maximum estimate.

TABLE 5. COMPARISON OF FCC ACCESS CHARGE DECISIONS WITH H.R. 4102 AND S. 1660

Component	Original FCC Decision 12/22/82	FCC Decision As Modified 1/19/84	H.R. 4102	S. 1660
Recovery of Local Fixed Costs Allocated to Interstate Service				
General approach	Fixed costs recovered through monthly fees paid by subscribers.	Most fixed costs eventually recovered through monthly fees paid by subscribers.	Recovery of most fixed costs to continue from long-distance charges.	Final recovery methods not yet determined.
Subscriber access charges	To be imposed on all subscribers April 3, 1984.	Fixed charges on residential and single- line business customers delayed until June 1985. Not to exceed \$4.00 monthly until 1990. Exemptions to be de- vised for customers who cannot pay.	Permanent prohibition against fixed charges on residential and single-line business customers.	Moratorium on fixed charges on residential and single-line business customers until Jan. 1, 1986.
Charges on facilities that do not now make contribution to local fixed costs	During transition period, special charges imposed on private lines and other facilities connected with phone system.	Same as original decision.	Permanent charges on both connecting facilities and private systems that do not connect.	Similar to H.R. 4102 but less detailed.
Universal Service Fund (Assistance to Companies with High Fixed Costs)				
Eligibility criteria	All companies having average costs greater than 115% of national average.	More assistance for small companies. Method and eligi- bility not yet determined.	Small companies having costs higher than 110% of national average and large companies having costs exceeding 150% of national average.	Small companies receiving REA loans and having costs higher than 110% of national average.

(Continued)

TABLE 5. (Continued)

	Original FCC Decision 12/22/82	FCC Decision As Modified 1/19/84	H.R. 4102	S. 1660
Universal Service Fund (Continued)				
Estimated size of fund (In 1984 dollars)	\$900 million.	Greater than \$900 million.	\$554 million.	\$180 million.
Lifeline Service				
Availability	States may require.	Not yet determined.	Mandatory for all states.	States may require.
Subscriber access charges for life- line subscribers	FCC may waive access charges.	Not yet determined.	Not applicable--resi- dential access charges prohibited.	No provision.
Costs of lifeline service not paid by subscribers will be paid from	Other service offerings.	Not yet determined.	50% from Universal Service Fund; 50% from other service service offerings.	Up to 50% from Universal Service Fund; remainder from other service offerings.
Final Decisions on Changes in Cost Allocation and Recovery Made by	FCC.	FCC.	New Universal Service Board.	New Universal Service Joint Board.

questions of cost allocation and recovery that were previously under the FCC's jurisdiction. ^{6/}

Discussion. The House bill would place primary emphasis on precluding hardship through prompt action rather than on the longer-run goal of economic efficiency. (This concern is further reflected in the comprehensive provisions for lifeline service.) To ensure that access charges would not impair the availability of service, the House bill would relieve all residential and small business subscribers of higher monthly fixed charges. Thus, high-income telephone users would benefit to the same extent as low-income users.

Since the prices charged for long-distance services would continue to include a contribution towards local fixed costs, few of the efficiency gains sought by the FCC would be achieved. In principle, charges imposed on private systems would reduce incentives for large telecommunication users to operate such systems, and thus increase the feasibility of maintaining a high level of toll support for local rates. It may prove difficult, however, to define accurately those activities subject to bypass charges and to set an appropriate level of charges. If charges on private systems were set too low, they might not prevent bypass of existing facilities, and the fixed costs of the present system would remain to be shared by fewer subscribers. Charges set too high could discourage competition from private systems and hence reduce the incentives for cost reduction.

The Senate Bill

Major Provisions. S. 1660, also entitled the Universal Telephone Service Preservation Act, is intended to provide time for additional analysis and information gathering before final decisions on subscriber access charges are made. Rather than permanently prohibiting access charges, the bill would delay their imposition on residential and small business subscribers until January 1, 1986. Like the House bill, S. 1660 would require payments to support local fixed costs from most private systems whether or not they connect with the facilities provided by local telephone companies.

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6. It is not clear whether the Universal Service Board established by both H.R. 4102 and S. 1660 would be an on-budget agency. If the collection and disbursement of funds were reflected on-budget, the net budget effect, over time, would be negligible because payments to the carriers would be offset by receipts. The federal government would, however, incur some administrative costs. This CBO cost estimate appears in Senate Report No. 98-270, (October 7, 1983), pp. 16-17, and in House Report No. 98-479, (November 3, 1983), p. 33, the reports accompanying the respective telephone bills.

Under the Senate bill, the Universal Service Fund would provide assistance only to small companies that have high costs and receive loans from the Rural Electrification Administration (REA). As a result, the needed size of the fund (about \$180 million in 1984) would be substantially smaller than the similar funds proposed by the FCC and the House bill.

S. 1660 would not require that lifeline service be provided in all states. As in the FCC access charge decision, the public utility commission of each state would decide whether such service should be offered. If it was, S. 1660 would provide payments to help support it from the Universal Service Fund. As in the House bill, S. 1660 would create a new panel of federal and state commissioners to decide questions of cost allocation and recovery.

Discussion. By delaying the imposition of access charges, the Senate bill would separate the issue of access charges from other factors currently influencing local telephone rates (such as revised depreciation practices). This could allow the Congress time to consider alternative approaches and to incorporate more complete information into its deliberations.

The Senate bill would be less certain than the House bill to provide protection for individuals who may be adversely affected--not only because of the possible imposition of access charges in 1986 but also because of a smaller Universal Service Fund and less comprehensive requirements for lifeline service. Moreover, postponing a final decision on access charges would create a period of uncertainty during which the telephone industry would not know the ultimate recovery method for fixed costs. This might delay decisions about investment in new technology and private systems until the rules of the game were known. The Senate requirement that charges be imposed on private facilities used in lieu of those provided by local telephone companies is similar in effect to that in the House bill.

ALTERNATIVE APPROACHES

In addition to the approaches embodied in the current legislation and FCC decisions, the Congress might wish to consider additional alternatives to reduce the current level of toll support for local services, while providing assistance to those subscribers most adversely affected. The discussion below summarizes two general strategies that could assist subscribers, yet permit more efficient methods of recovering local fixed costs than exist now. These are:

- o Assistance to needy individuals, and
- o Assistance to customers of high-cost companies.

Assistance to Needy Individuals

Higher fixed monthly charges may cause hardships for low-income individuals. Programs to assist those individuals can be divided into two types--those that provide assistance by giving subscribers more income and those that provide assistance by lowering the price of telephone service. The first approach would permit prices to reflect the costs of providing service and protect needy individuals by increasing their incomes to enable them to cope with price changes. The second approach would prevent changes in the prices charged to needy individuals.

Income Strategies. If subscribers were to pay fees reflecting local fixed costs traditionally allocated to interstate service, the monthly fees would average about \$5.00 (in 1982 costs). ^{7/} Thus a simple program of direct assistance might be considered in which each low-income household received a monthly grant--say, \$5.00, the average level of access charges nationwide. Such a program would cost about \$600 million per year, exclusive of administrative costs. ^{8/} The funds supplied to needy households could either be used to help purchase telephone service or be spent on other goods and services. Cash programs such as this allow each individual's preferences to be expressed fully since each individual decides how the money should be spent. ^{9/} Such a program, however, would involve large administrative costs relative to the size of the individual grants.

A program that has many of the attractive features of a cash program, but with lower administrative costs, might utilize an existing system of

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7. This level of charges would recover most local loop costs now allocated to interstate service. Other subscriber plant costs associated with terminal equipment and inside wiring would continue to be recovered through toll revenues.
 8. In 1982, about 3 million households received food stamps. In addition, some households were eligible for other assistance programs (such as Aid to Families with Dependent Children) but were ineligible for food stamps. The program costs estimated here are based on 10 million eligible households.
 9. Eligible individuals who continued telephone service would be no worse off since the cash assistance would offset the increased price of service. The welfare of individuals who did not choose to purchase telephone service at the higher price would actually be improved by the combination of access charges and grants to offset price increases, reflecting their decision to purchase other services rather than to continue their previous expenditure patterns.

eligibility and administration. For example, each household receiving food stamps might receive an extra \$5.00 of stamps monthly. Such a program would cost slightly less than \$500 million a year. ^{10/} Since most households spend considerably more on food than is covered by food stamps, the higher level of food stamp assistance would free \$5.00 to be spent for other purposes, such as telephone service. Such a program would presuppose that those eligible for food stamps were the same individuals to be targeted for telephone assistance.

Pricing Strategies. Needy individuals might be protected against hardships caused by access charges simply by exempting them from those charges. For example, recipients of food stamps, AFDC benefits, or other income maintenance programs might be relieved of access charges simply by notifying the local phone company of their participation in such programs.

Lifeline service--telephone service provided at rates below costs to low-income individuals--might be used to reduce the undesirable effects of access charges and also to extend service to individuals who would not subscribe even if relieved of the burden of access charges. "Budget" or "economy" service is currently available in many areas and typically consists of a low monthly fixed charge combined with usage charges based on the number of calls made. Current offerings of this service, however, are not limited to low-income groups and the service is often purchased by households desiring a second line. Several state regulatory commissions have expressed concern that a discounted service restricted to low-income subscribers would not be permitted under state laws prohibiting discrimination. Thus a program to offer lifeline service in all states would require legislation to preempt state laws. Because access charges are designed to recover only those costs allocated to interstate service, similar legislation might not be required for the FCC to exempt low-income subscribers from such charges.

Comparison of Income and Pricing Strategies. Although the distinction between pricing and income strategies is blurred by the fact that pricing approaches also have income effects, there are indeed differences between the two strategies. In general, pricing strategies would result in a slightly higher percentage of households continuing telephone service than income approaches. This would occur because the price of phone service would be reduced while, under the income strategies, some subscribers

10. Assistance allocated to food stamp recipients only would be lower (\$500 million versus \$600 million) because it would not include the additional AFDC families counted in the direct grants (see footnote 8).

would decide to purchase other goods and services. In concept, income strategies should be more efficient than pricing approaches since they allow prices to reflect costs and allow needy individuals to express their preferences more fully.

A major difference between the two types of approaches is that many pricing strategies may be accomplished administratively and funded by flows of cross subsidies within the industry. Thus, regulatory decisions would require that some subscribers be charged prices above costs in order to subsidize other subscribers. Income strategies, in contrast, tend to require external funds to provide assistance and most would entail new legislation. Although reliance on public funds rather than cross subsidies might allow more equitable financing, FCC and industry attention has concentrated on pricing strategies that might be administered without federal funding and implemented without additional legislation.

Assistance to Customers of High-Cost Companies

Some small companies have unusually high costs and some have been able to assign as much as 85 percent of their local fixed costs to interstate service. Changes in the allocation and recovery of fixed costs could result in sharply higher fixed monthly charges for the customers of such companies.

One approach to alleviate hardship for these customers is the Universal Service Fund, first developed by the FCC and included in modified form in the House and Senate bills. Such a fund could be structured in a variety of ways, differing principally in the level of costs above which support would be provided, the proportion of "high costs" covered by the fund, and the size of eligible companies. The funds required would range from \$180 million to \$900 million annually. Each of the current proposals would rely on funds generated by a nationally uniform surcharge on toll calls rather than on the appropriation of federal funds. But several other approaches might be considered to assist the customers of high-cost companies.

Changes in the Allocation of Costs. Under the new FCC allocation procedures now scheduled to begin in 1986, companies that have traditionally been able to assign an unusually large proportion of costs to interstate service will no longer be able to do so. Under the new procedures, all companies will assign the same proportion of fixed costs--25 percent--to interstate service. The new allocation procedure might be modified so that smaller, high-cost companies would be able to assign a larger share of their fixed costs to interstate service. Alternatively, such companies might be permitted a longer transition period to reach the 25 percent allocation.

Flexibility in Recovery Methods. Companies with unusually high fixed costs tend to be smaller companies serving a relatively small portion of business subscribers. Therefore, these companies might be less subject to the threat of bypass than companies serving high-volume business customers. Smaller companies might be granted greater flexibility than larger companies in the methods used to recover fixed costs assigned to interstate service. For example, rather than recovering those costs through fixed monthly charges, such companies might recover a portion of those costs through surcharges on the toll calls made by their customers.

Expansion of Federal Support. Assistance could be provided to small companies serving rural areas through programs administered by the Rural Electrification Administration (REA). Indeed, some 1,000 of the nation's 1,400 local telephone companies now participate in REA programs. In addition to direct loans from the Rural Electrification and Telephone Revolving Fund, the REA also provides loan guarantees and administers the Rural Telephone Bank as a supplemental source of financing. In the aggregate, these sources will provide about \$560 million in loans and loan guarantees during fiscal year 1984. In effect, these loans, which are provided at rates below the government's cost of borrowing money, represent subsidies that, while off-budget and thus largely invisible, are not costless.

Such subsidized assistance might be expanded or alternative programs considered. For example, the tax deferral currently allowed for public utility dividends that are reinvested in the utility might be extended to include telephone companies. Doing so would allow shareholders to reinvest dividend income in the purchase of additional stock and to exclude the amount invested from their current income. It is not clear, however, whether this approach would simply displace investments that would have been made anyway or whether it would stimulate additional investment. In any case, extension of the reinvestment tax deferral program to the telephone industry would reduce federal revenues by about \$100 million annually. These more general programs of loan or tax assistance would support all parts of a company's operations rather than being targeted toward individual hardships caused by higher fixed monthly charges.

Discussion. In general, society as a whole benefits when prices are related to the costs of producing goods and services. Setting long-distance prices above costs and local prices below costs results in a net reduction in social benefits. This occurs because people who want to make long-distance calls and would pay the full costs of doing so make fewer calls if they must pay more than the cost. At the same time, a few consumers who place little value on having a phone readily available are induced to subscribe to below-

cost basic service even though they would not pay the full costs if asked to do so. The size of this "efficiency loss" was estimated at \$1.6 billion in 1980 by the National Telecommunications and Information Administration of the Department of Commerce. ^{11/} While the accuracy of this estimate is conjectural, a reduction of the contribution provided by toll services to local services would surely move in the direction of economic efficiency. Most customers would continue to subscribe to telephone service even at rates that covered the full costs.

Also, the provision of service at prices set below the costs of providing the service results in a transfer of income from those who make a large number of long-distance calls to those individuals who do not. A move to more efficient pricing would, therefore, be beneficial to some individuals and detrimental to others.

The Congress might choose to take no action and permit the FCC to implement its access charge program. A "do nothing" approach could be justified for several reasons. First, changes in telephone rates might be viewed as being similar to price changes for other services. While all price changes tend to benefit some individuals at the expense of others, the government does not normally seek to freeze prices in an attempt to protect individuals who might otherwise suffer. Second, the level of access charges now proposed--limited to \$4.00 monthly until 1990--might not be considered to be high enough to cause extreme hardship. Third, the FCC has proposed to establish a Universal Service Fund to assist the subscribers of high-cost companies and is now exploring means of exempting low-income subscribers from access charges. Finally, telephone rates are reflected in the Consumer Price Index (CPI). Since Social Security payments and other income support measures are adjusted to reflect changes in the CPI, some measure of protection is already provided.

If the Congress should choose to enact legislation to alleviate hardships, there are several remedies that would preserve most of the benefits of more efficient pricing. Programs designed to assist needy individuals or to assist subscribers of companies with high costs might allow up to 90 percent of the toll support traditionally provided for local rates to be terminated, while preserving the rest of the support.

From the point of view of needy persons, cash programs allow each individual's preferences to be exercised fully. Thus, cash grants or other

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11. Federal Communications Commission, Common Carrier Docket 80-286, comments of the National Telecommunications and Information Administration, Appendix D (August 17, 1981).

income programs would allow each needy individual to choose between continued telephone service and the purchase of other goods and services. In contrast, categorical grants or cross subsidies tend to impose the preferences of others. Thus, if primary emphasis was placed on the widespread availability of service, the Congress might prefer programs that lower the price of service--thereby encouraging lower-income individuals to continue subscribing to telephone service rather than changing their expenditure patterns.

Both bills considered in the 98th Congress would, at least for the near future, continue telephone service to residential and small business customers at rates below full costs. In the short term, this would have little effect on the federal budget since support for local rates would continue to be provided by the use of cross subsidies within the industry. In the longer term, however, should increasing competition within the industry undermine the feasibility of continued cross subsidies, continued support for local rates might require the government to assume a larger role in the collection and disbursement of funds. If this should occur, there could be a substantial effect on both federal revenues and outlays since the various proposals to assist needy individuals or the customers of high-cost companies range around \$500 million for each program. Therefore, a program that combined these two objectives might cost slightly more than \$1 billion annually. Indeed, the combination of lifeline service and assistance to rural companies provided in H.R. 4102 was estimated to cost \$1.2 billion annually. Should the government seek to hold all local rates below costs, about \$1 billion annually would be required for each \$1.00 reduction in average monthly residential rates.

APPENDIXES

APPENDIX A. THE ENFIA ISSUE

Most long-distance calls originate and terminate using the facilities of local telephone companies. The long-distance transmission may be handled by AT&T Communications (called the Long Lines Department prior to divestiture) or by another carrier such as MCI. ^{1/} Under an agreement known as Exchange Network Facilities for Interstate Access (ENFIA), which was subsequently filed as a tariff, carriers such as MCI paid a lower rate for using those facilities than did AT&T. Under the terms of the Modification of Final Judgment, which settled the AT&T antitrust case, each Bell Operating Company is required to provide equal access to all long-distance carriers. When equal access is provided (in most cases by late 1986), all long-distance carriers will pay the same rates for using the subscriber loops provided by local telephone companies.

Until equal access is provided, the Federal Communications Commission (FCC) remains faced with the question of what the differential should be between the rates paid by AT&T's long-distance operations and the rates paid by competing carriers that do not have available interconnection of equal quality. In its access charge decision, the FCC initially decided that the differential should be substantially reduced. Competing carriers claimed this reduction was unwarranted and would be seriously detrimental to them.

On January 19, 1984, the FCC announced that it would revise its decision so that a larger differential than originally proposed would be continued. At the same time, the FCC announced that it would undertake further administrative proceedings to consider what the differential should be during 1986 and later years until equal access is provided. Legislation passed by the House of Representatives (H.R. 4102) would generally "freeze"

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1. The same local loop between a customer's premises and the phone company's local office is used for all calls, both local and long-distance. If a toll call is carried by AT&T, the call goes from the customer to the local phone company office and then into AT&T's long-distance network. If the call goes by MCI, the call travels over the same local loop to the phone company office, is then switched over another local loop to the MCI office, then over the MCI long-distance network to the terminating city where it is switched from the MCI office to the local phone company office to the final destination.

the existing ENFIA arrangement until equal access is provided. This appendix summarizes the issues involved in interconnection arrangements.

MCI, GTE Sprint, and other carriers offering long-distance switched service similar to AT&T's Message Telecommunications Service are collectively referred to as "Other Common Carriers" (OCCs). When MCI first entered the switched long-distance market in 1975, it was not well-received by the existing industry. First, the industry argued that the service offered by MCI (marketed under the name Execunet) was illegal and that MCI was restricted to providing private-line services. The FCC agreed and ordered the service terminated. The court of appeals overturned the FCC and ruled that MCI could offer switched services. ^{2/} Next, in 1978, AT&T argued that it was not required to interconnect with MCI. Again the FCC agreed and was overturned by the court. ^{3/}

At that time, MCI was simply paying local business-line rates for the connection between its switches and the offices of the local phone companies. The Bell system companies then filed a new tariff featuring much higher rates for the services used by competitors in originating and terminating long-distance messages. MCI protested that the new tariff--ENFIA--was unlawful, anticompetitive, and insufficiently supported. Given the commission's previous inability to determine the lawfulness of tariffs, it was not clear how the matter would be resolved. ^{4/} At the suggestion of the Assistant Secretary of Commerce, the FCC encouraged negotiations in an attempt to produce "rough justice" in the form of an interim method of compensation to be paid by OCCs to local phone companies. During the interim period, the FCC would investigate the matter and determine more permanent arrangements.

During several months of negotiations in late 1978, local companies generally took the position that, if they had to interconnect with other long-distance carriers, they should receive the same contribution towards supporting the local loop that was received from conventional long-distance

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2. This case is known as Execunet I.
 3. This case, known as Execunet II, led the FCC to institute its general examination of the long-distance market and its eventual adoption of access charges.
 4. At the time, the FCC had been attempting to determine, for more than 15 years, the lawfulness of AT&T's Telpac tariff.

traffic. The OCCs, in contrast, argued that the quality of service they received was less than equal, that they had never agreed to provide contributions to support the local loop, and that they should only pay the local business rate. Ultimately, AT&T and the OCCs reached an agreement, subsequently approved by the FCC, under which the OCCs would make some contribution to the local loop but would pay lower rates than AT&T.

The ENFIA agreement was to last for three years, beginning in April 1979, or until the FCC prescribed a system of access charges to replace the agreement. If the FCC determined that an extension was reasonable and in the public interest, the agreement would be extended for an additional two years. In April 1982, the FCC extended the agreement until April 1984. ^{5/} Subsequently, the FCC required that the agreement be continued until replaced with access charges. ^{6/}

The lower rates paid by the OCCs reflect the fact that the interconnection arrangements between AT&T's long-distance services and local companies are far superior to the interconnections between local companies and other common carriers. AT&T customers can make long-distance calls by dialing 10 or 11 digits while customers of OCCs must dial 22 or 23 digits. AT&T customers can use rotary dial phones while OCC customers must use pulse signaling. AT&T has available automatic number identification (ANI), which automatically identifies the number from which a call is placed. It also has "answer supervision," which tells when the party being called has answered the phone. The combination of ANI and answer supervision enables accurate billing of completed calls.

The OCCs, in contrast, know only the amount of time involved and do not know whether calls are completed. As a result, they either bill for all attempts (including uncompleted calls) or guess at whether calls are completed. In addition, the technical quality of the transmission over OCC facilities is inferior, which results in either the OCC offering a lower quality of service or expending funds on equipment to improve the quality of

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5. Federal Communications Commission, Docket 82-180, ENFIA, Order adopted and released April 14, 1982.
 6. Federal Communications Commission, Docket 83-1145, Memorandum Opinion and Order (March 28, 1984).

transmission. ^{7/} From the viewpoint of AT&T, the differential in quality is a natural result of the fact that the connections between local distribution facilities and long-distance facilities provided by AT&T Communications were engineered to provide high quality long-distance service while the OCCs are trying to "patch in" with business lines not designed for such service. From the viewpoint of the OCCs, the different quality is simply another manifestation of AT&T's attempt to dominate the industry unfairly.

Regardless of the causes, OCCs do not now have "equal" interconnection and it is impossible to determine exactly what the differential in payments for interconnection should be. The current situation will be radically altered as a result of the equal interconnection requirements of the AT&T divestiture. Under the terms of the Modification of Final Judgment, which settled the AT&T antitrust case, each Bell Operating Company is to offer all interexchange carriers "exchange access on an unbundled, tariffed basis, that is equal in type and quality to that provided for the interexchange telecommunications services of AT&T and its affiliates." ^{8/} Each Bell Operating Company (BOC) is to provide such access on at least one-third of its lines by September 1, 1985, and generally to provide such access by September 1, 1986. ^{9/} GTE, when it acquired Sprint from Southern Pacific, agreed to similar equal interconnection provisions. Although other independent phone companies are not bound by the equal interconnection commitments made by the Bell system and GTE, they have traditionally been more receptive to interconnection than the Bell system. In any event, since the Bell Operating Companies and GTE account for 90 percent of the nation's exchange service, competitive interexchange carriers should generally have interconnection of equal quality to that received by AT&T by the end of 1986.

The size of the discount received by OCCs depends on two factors. The first is the nominal discount from the price paid by AT&T. Equally important from a practical standpoint is the number of minutes upon which the charge is paid. Under the terms of ENFIA, charges were not paid on the

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7. Federal Communications Commission, Docket 78-72, Memorandum Opinion and Order, released August 22, 1983. Paragraphs 101-105 discuss the interconnection differences at length.
 8. Modification of Final Judgment, January 8, 1982, Appendix B, Phased-In BOC Provision of Equal Exchange Access, page 11.
 9. An exception is provided for lines served by older switches or small offices if the operating company convinces the court that such access is not feasible or justified.

basis of actual usage. Rather, charges were based on the estimated amount of usage for an average ENFIA line during the prior year. During 1982, the OCCs and AT&T engaged in arguments over how usage should be measured and what the correct figure should be. In September 1982, the commission set a level of usage per line--4,474 minutes per month--that was considerably lower than the actual minutes claimed by AT&T but substantially higher than the number of minutes that the OCCs thought should be counted. The result seemed to reflect another in a series of attempts to achieve rough justice--to set an overall rate of compensation that was fairer to AT&T than the previous rate and yet a rate the OCCs could live with. ^{10/} The combination of low minute counts and the nominal discount meant that the actual discount received by OCCs during 1983 was in the range of 70 percent.

The FCC's access charge decision, as originally announced, would have reduced the nominal discount. In addition, access charges would have been applied to actual minutes of use, rather than a lower amount. These changes--especially the change in the manner in which minutes were counted--would have effectively cut the discount in half: the OCCs would have received a discount of 35 percent rather than 70 percent. The OCCs protested that their interconnection costs would double, with no improvement in interconnection. They argued that competitive carriers could not exist with inferior interconnection and a discount of only 35 percent. ^{11/} AT&T, of course, argued that the existing discount was far too large and a primary reason for OCC growth rates averaging 80 percent per year. Further, the ENFIA arrangement was intended only as an interim arrangement until the FCC could determine the proper level of charges.

The changes originally ordered by the FCC reflected the commission's attempt to determine what the discount should be, based on the value of AT&T's premium access. In late October 1983, the National Telecommunications and Information Administration (NTIA) asked the FCC to abandon its

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10. Federal Communications Commission, Docket 78-37, Memorandum Opinion and Order, released September 29, 1982, p. 14. The number of minutes was subsequently adjusted to about 5,500.
 11. Letter to Mark D. Fowler, Chairman, Federal Communications Commission, October 4, 1983, signed by representatives of United States Transmission Systems, U.S. Telephone, Satellite Business Systems, EMX Telecom, MCI, GTE, Western Union, and Lexitel.

attempt to estimate the value of premium access. ^{12/} NTIA argued that the value of premium access was impossible to calculate with any degree of accuracy and, instead, the FCC should simply concentrate on smoothing the transition from current ENFIA rates to equal access charges when equal interconnection was provided. On January 19, 1984, the commission announced that it would make substantial changes in its original proposals. Rather than reducing the discount received by OCCs from 70 percent to 35 percent, a discount of approximately 55 percent would be retained, pending further administrative proceedings. In May 1984, the ENFIA agreement was replaced with access charges reflecting the 55 percent discount. ^{13/}

The dispute over ENFIA reflects the difficulty experienced by an administrative agency in trying to equalize conditions among competitors. Unable to determine a fair outcome, the FCC initially presided over negotiations designed to produce an interim system of payments. In its subsequent considerations, it has faced conflicting claims. On the one hand, competitors have argued that increased charges would put them out of business. On the other, the telephone industry has argued that the competitors were getting a free ride and that the below cost services provided to them were being paid by other conventional subscribers. In general, the FCC has come out somewhere in the middle and pleased neither side.

The ENFIA dispute has added considerable confusion to the larger issue of access charges. The OCCs have consistently supported the replacement of the present system of separations with access charges and also supported the recovery of subscriber plant costs on a flat-rate basis rather than on a usage-sensitive basis. Nevertheless, changes in their ENFIA charges have caused them actively to seek changes in the overall access charge decision.

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12. Federal Communications Commission, Docket 78-72, National Telecommunications and Information Administration, Comments on Petitions for Further Reconsideration (October 28, 1983).
 13. As the FCC was reconsidering its original action, the House passed H.R. 4102 on November 10, 1983. This bill would have frozen the existing ENFIA charges until the FCC determined that equal access was available.

APPENDIX B. THE DEVELOPMENT AND AVAILABILITY OF TELEPHONE SERVICE

The telephone industry is more than a hundred years old. The Bell Telephone Company was organized in 1877, the original Bell patents expired before the turn of the century, and AT&T reached its first antitrust settlement with the Justice Department in 1913. ^{1/}

Despite the long history of the industry, widespread residential service of the type common today has developed only in more recent years. At the end of World War II, fewer than half of American households had phone service. Of those that did, more than two-thirds did not have single-party service, and 40 percent did not have dial service. ^{2/}

The number of telephones per hundred people traditionally provided a useful measure of the availability of telephone service and is still used today for most international comparisons. The measure served rather well for the first hundred years of the industry when phones were leased from the telephone company and few homes had more than one telephone. The historical development of service, using this measure, is shown in Table B-1. The availability of service, which showed little change in the 1920s and declined during the depression, doubled between the end of the war and 1960 and doubled again by 1980.

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1. Facing the threat of antitrust action under the Sherman Act, AT&T promised to dispose of its stock in Western Union, to interconnect with independent telephone companies, and to cease acquiring competing companies. The agreement, in the form of a letter from AT&T Vice President Kingsbury, has become known as the "Kingsbury Commitment." Since the letter was sent before any formal legal proceedings, the settlement was not an actual consent decree. It did, however, have the effect of stabilizing AT&T's share of the telephone industry at about 80 percent of the nation's phones--a share that has remained relatively stable ever since.
 2. Bell System Statistical Manual, 1940-1972.

TABLE B-1. DEVELOPMENT OF U.S. TELEPHONE SERVICE
(By calendar year)

Year	Telephones per 100 People
1900	2
1905	5
1910	8
1915	10
1920	13
1925	15
1930	16
1935	14
1940	17
1945	21
1950	28
1955	34
1960	41
1965	48
1970	59
1975	69
1980	79

SOURCES: Federal Communications Commission, Statistics of Communications Common Carriers; Statistical Abstract of the United States.

Several trends have made the measure of phones per person much less meaningful in the past few years. These include the switch to modular phones (easily plugged into a telephone jack rather than wired by installers) and the deregulation of customer premises equipment. The ability of individuals to purchase inexpensive telephones and to install the phones themselves has led to a vast increase in the number of extension telephones. More than 20 million units were sold during 1983, which increased the nation's total stock of telephones by more than 10 percent. In addition to making the statistics of telephones per person less significant, such trends

also make the statistic more difficult to measure since the industry no longer has such accurate knowledge of the number of phones. ^{3/}

The most widely used measure of current telephone availability is the percentage of households with telephone service--sometimes called a measure of telephone "penetration." Changes in the level of penetration over the past 30 years reflect changes both in the industry and in the demographics of the U.S. population. Since 1950, the total population has increased by about 50 percent; but the number of households has almost doubled, and the number of households with telephone service has almost tripled. Thus, while the number of households with telephone service was approximately 62 percent in 1950, the figure rose to more than 95 percent by 1980. At the same time, the quality of service increased rapidly. The conversion to dial service was completed, direct-distance dialing became widely available, and one-party service became the industry standard (see Table B-2). More and more subscribers added extension telephones (even before prices were reduced with the introduction of competition in the terminal equipment market) and the proportion of subscribers with flat-rate service increased. While the independent telephone companies tended to lag slightly behind the Bell system, they too have completed the transition to single-party dial service. The widespread development of residential service occurred during a period of rapidly rising income and of monthly service charges that were constant or falling in real terms (see Table B-3).

Statistics on the geographic availability of telephone service are shown in Table B-4. The percentage of households with telephone service is 96 percent nationally. Because some households have more than one main telephone or access line, there is a slight overstatement in the number of households with phone service. For example, in some states, more than 100 percent of households are reported as having phone service. All states outside the Far West and South are estimated to have more than 90 percent penetration.

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3. Although consumers are still required to report privately owned telephones to the local telephone company, there is no certain knowledge about how many consumers do so and how many do not. The industry estimates that up to 80 percent of privately installed phones are not reported.

TABLE B-2. DEVELOPMENT OF RESIDENTIAL SERVICE AND MEASURES OF SERVICE QUALITY
(By selected calendar year)

Year	Percent of All Households with Telephone Service	Percent with Dial Service <u>a</u> /	Percent with Direct-Distance Dialing <u>a</u> /, <u>b</u> /	Percent with 1-Party Service <u>b</u> /	Ratio of Extension Phones to Main Lines <u>b</u> /	Percent with Flat-Rate Service <u>b</u> /
1945	46	58	<u>c</u> /	29	.06	79
1950	62	71	<u>c</u> /	24	.11	81
1955	72	84	6 <u>d</u> /	38	.16	82
1960	79	96	48	57	.31	85
1965	85	100	87	73	.41	87
1970	91	100	95	84	.52	89
1975	94	100	<u>c</u> /	91	.62	<u>c</u> /
1980	96	100	<u>c</u> /	94	.74	<u>c</u> /

SOURCE: Bell System Statistical Manuals, 1973 and 1982 editions.

- a. Data include business customers.
- b. Bell system only.
- c. Not available.
- d. 1956 data.

TABLE B-3. AVERAGE HISTORICAL CHARGES FOR INDIVIDUAL RESIDENTIAL TELEPHONE SERVICE (By calendar year)

Year	Average Monthly Charge for Individual Residential Phone Service (In current dollars)	Purchasing Power of the Dollar (In 1980 dollars)	Average Monthly Charge for Individual Residential Phone Service (In 1980 dollars)
1950	4.29	3.400	14.58
1951	4.48	3.150	14.11
1952	4.62	3.083	14.25
1953	4.93	3.059	15.08
1954	5.10	3.044	15.53
1955	5.19	3.056	15.86
1956	5.24	3.012	15.78
1957	5.28	2.907	15.35
1958	5.36	2.831	15.17
1959	5.51	2.806	15.46
1960	5.55	2.762	15.33
1961	5.61	2.735	15.35
1962	5.62	2.706	15.21
1963	5.65	2.674	15.11
1964	5.66	2.637	14.93
1965	5.67	2.593	14.70
1966	5.64	2.522	14.22
1967	5.60	2.451	13.73
1968	5.61	2.353	13.20
1969	5.68	2.233	12.68
1970	5.76	2.108	12.14
1971	6.04	2.020	12.20
1972	6.38	1.956	12.48
1973	6.69	1.843	12.33
1974	7.08	1.662	11.77
1975	7.32	1.522	11.14
1976	7.81	1.439	11.24
1977	8.07	1.350	10.90
1978	8.31	1.255	10.43
1979	8.40	1.127	9.47
1980	8.61	1.000	8.61

SOURCE: Federal Communications Commission, Common Carrier Docket No. 80-286, Comments of the National Telecommunications and Information Administration to the Federal-State Joint Board, Appendix B (August 17, 1981), page 11.

TABLE B-4. TELEPHONE SERVICE BY STATE, FOR DECEMBER 1981

State	Total Number of Telephones	Distribution of Telephones by Type of Service		Resident Population	Total Telephones Per 100 Population	Percent Households With Telephone Service ^{a/}
		Residential	Business			
Alabama	2,640,727	2,013,822	626,905	3,962,000	66.65	87
Alaska	325,000 ^{b/}	208,000 ^{b/}	117,000	412,000	78.88	90
Arizona	2,194,558	1,630,688	563,870	2,863,000	76.65	95
Arkansas	1,461,555	1,114,927	346,628	2,328,000	62.78	85
California	21,163,281	14,994,878	6,168,403	24,403,000	86.72	100
Colorado	2,560,912	1,823,533	737,379	3,014,000	84.97	97
Connecticut	2,702,092	1,999,582	702,500	3,133,000	86.25	103
Delaware	540,123	391,222	148,901	601,000	89.87	100
District of Columbia	1,094,898	511,118	583,780	631,000	173.52	103
Florida	8,679,284	6,504,473	2,174,811	10,143,000	85.57	98
Georgia	4,339,135	3,214,403	1,124,732	5,586,000	77.68	88
Hawaii	721,926	470,475	251,451	989,000	73.00	98
Idaho	717,652	529,417	188,235	985,000	72.86	92
Illinois	10,275,846	7,700,284	2,575,562	11,438,000	89.84	99
Indiana	4,117,473	3,140,906	976,567	5,501,000	74.85	92
Iowa	2,297,443	1,736,326	561,117	2,939,999	78.17	95
Kansas	2,008,332	1,521,149	487,183	2,407,000	83.44	96
Kentucky	2,337,658	1,775,985	561,673	3,702,000	63.15	86
Louisiana	3,091,845	2,327,514	764,331	4,294,000	72.00	93
Maine	815,587	629,480	186,107	1,144,000	71.29	98
Maryland	3,648,571	2,708,286	940,285	4,272,000	85.41	99
Massachusetts	4,654,749	3,384,834	1,269,915	5,758,000	80.84	101
Michigan	7,253,301	5,526,140	1,727,161	9,295,000	78.03	98
Minnesota	3,256,597	2,394,889	861,708	4,143,000	78.60	99
Mississippi	1,612,513	1,246,448	366,065	2,568,000	62.79	82
Missouri	3,878,677	2,901,274	977,403	4,985,000	77.81	94
Montana	630,733	461,943	168,790	805,000	78.35	95
Nebraska	1,344,341	998,285	346,056	1,582,000	84.98	100
Nevada	756,148	516,269	239,879	870,000	86.91	84

(Continued)

TABLE B-4. (Continued)

State	Total Number of Telephones	Distribution of Telephones by Type of Service		Resident Population	Total Telephones Per 100 Population	Percent Households With Telephone Service a/
		Residential	Business			
New Hampshire	727,611	545,041	182,570	955,000	76.19	99
New Jersey	6,797,352	5,026,272	1,771,080	7,413,000	91.70	108
New Mexico	896,584	625,661	270,923	1,355,000	66.17	86
New York	12,749,979	9,370,000	3,379,979	17,432,000	73.14	97
North Carolina	4,325,419	3,261,481	1,063,938	5,968,000	72.48	91
North Dakota	541,479	396,208	145,271	665,000	81.43	98
Ohio	8,085,385	6,179,172	1,906,213	10,786,000	74.96	94
Oklahoma	2,550,326	1,869,598	680,728	3,105,000	82.14	96
Oregon	2,034,403	1,421,853	612,550	2,757,000	73.79	86
Pennsylvania	9,894,620	7,509,655	2,384,965	11,831,000	83.63	99
Rhode Island	730,133	551,639	178,494	946,000	77.18	98
South Carolina	2,131,681	1,590,516	541,165	3,190,000	66.82	86
South Dakota	529,264	390,112	139,152	692,000	76.48	92
Tennessee	3,247,787	2,480,683	767,104	4,699,000	69.12	88
Texas	11,690,638	8,367,781	3,322,857	14,805,000	78.96	95
Utah	1,094,279	822,818	271,461	1,544,000	70.87	93
Vermont	377,716	278,625	99,091	524,000	72.08	101
Virginia	3,956,259	2,923,675	1,032,584	5,468,000	72.35	91
Washington	3,341,681	2,335,422	1,006,259	4,347,000	76.87	90
West Virginia	1,137,637	869,808	267,829	1,980,000	57.46	85
Wisconsin	3,501,055	2,622,358	878,697	4,774,000	73.34	98
Wyoming	429,361	296,592	132,769	519,000	82.73	89
Total						
United States	181,891,596	134,111,520	47,780,076	230,508,000	78.91	96

SOURCE: Federal Communications Commission, Statistics of Communications Common Carriers.

a. Households with service are the sum of main residence, apartment house PBX and residential service main telephones, and other residential PBX systems.

b. Estimate

APPENDIX C. THE COSTS OF SERVICE IN RURAL AREAS

Telephone companies serving sparsely populated or rural areas are commonly acknowledged to have high costs per subscriber for maintaining local lines. A thinner population means fewer customers per mile to pay for the common costs of line. Since many contend that subscribers in rural areas will pay higher rates than urban subscribers without toll support for local rates, it is useful to examine the question of rural versus urban costs.

Table C-1 displays descriptive information for five different categories of telephone companies. In general, as one moves across the categories from left to right, the companies become smaller and more rural. Data relating to the Bell Operating Companies are displayed in the first column; the Bell Operating Companies serve the most densely populated parts of the country. ^{1/} Although they serve only about half the land area of the United States, they provide service to 80 percent of the nation's telephones. The 24 operating companies service more than 85 million access lines--an average of 3.5 million each. ^{2/} The Bell system exchanges are far larger than the exchanges of other carriers, serving on the average more than 12 thousand lines.

The telephone companies that are not part of the Bell system are collectively referred to as the "independents" (see column 2 of Table C-1). Although there are approximately 1,400 independent operating companies, the vast majority of service is provided by a small number of larger companies. Of the 20 million lines provided by the independents, more than

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1. The statistics for the Bell Operating Companies (BOCs) in this section include two affiliated companies, Cincinnati Bell, Inc., and the Southern New England Telephone Company, which were not wholly owned by AT&T and were not technically Bell Operating Companies. Nevertheless, because of their affiliation with the Bell system, the FCC includes these companies in its statistical compilations of the Bell Operating Companies.
 2. An access line is basically associated with a telephone number. In rural areas, and for most residential and small business customers, the number of access lines is very similar to the number of subscribers.

TABLE C-1. DESCRIPTIVE STATISTICS BY CATEGORY OF COMPANY,
FOR 1981

Statistics	Bell Operating Companies (1)	Reporting Independent Companies (2)	REA Commer- cial Com- panies a/ (3)	REA Coopera- tives a/ (4)	Independent "Class B" Companies (5)
Number of Companies	24	768	695	254	48
Access Lines	85,987,000	20,560,936	3,529,188	991,112	26,084
Access Lines Per Company	3,582,792	26,772	5,078	3,902	543
Access Lines Per Exchange	12,513	2,135	919	549	b/
Access Lines Per Route Mile	b/	b/	6.9	3.4	b/

SOURCES: Federal Communications Commission, Statistics of Communications Common Carriers, Year Ended December 31, 1981; United States Independent Telephone Association, Independent Telephone Statistics, vol. 1 (1983 edition); United States Department of Agriculture, Rural Electrification Administration, 1981 Statistical Report, Rural Telephone Borrowers.

- a. For REA companies, main lines have been used instead of access lines and central offices instead of exchanges.
- b. Not available.

15 million are accounted for by the four largest companies--GTE, United, Continental, and Centel. The independents serve some major cities (Tampa, Florida; Rochester, New York; and part of Los Angeles), but tend to be concentrated in the less densely populated areas of the United States. The number of access lines provided per exchange is only about a sixth that of the Bell system. ^{3/}

The third column of Table C-1 contains statistics relating to commercial companies that have borrowed funds through the Rural Electrification Administration (REA). These companies are smaller than the average independent and average only about 5,000 lines per company. Their exchanges are only a tenth the size of the average Bell exchange and in the aggregate they serve only 3.5 million lines. ^{4/} The traditional measure of service density is the number of subscribers per route mile. As indicated in column three, the commercial companies associated with REA have only seven subscribers per route mile of line.

Even smaller, as shown in column 4 of Table C-1, are the cooperatives funded by REA. In the aggregate, the cooperatives provide service to only about a million subscribers and their exchanges are only half the size of the REA commercial companies. Population densities are even less, with an average density of only 3.4 subscribers per mile.

Finally, the smallest of all companies are represented in column five of Table C-1. These are independent telephone companies that are classified by the FCC as "Class B" companies. Class B companies are those with annual operating revenues between \$100,000 and \$250,000 per year. The 48 companies serve only 26 thousand access lines--an average of only 500 each.

The categories in Table C-1 are not mutually exclusive. Thus, some Class B companies are undoubtedly REA borrowers and are also included among the statistics for reporting independents. Because the categories are

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3. All statistics in column two are for independent telephone companies that report their statistics voluntarily to the industry trade association. Although a large number of small companies do not file such reports, the statistics represent more than 95 percent of the telephones and subscribers served by independents.
 4. REA traditionally reports its statistics on a per subscriber basis. Because the REA member companies tend to serve rural areas, the statistics are similar whether measured by subscriber, access line, or main station.

not mutually exclusive, the differences among them will tend to be slightly understated.

Table C-2 contains information on the cost of service and on revenues per line for the same five-way classification of telephone companies shown in Table C-1. Given the general notion that telephone service is most expensive in rural areas, one would expect that the smaller the company and the more sparsely populated the area served, the higher the costs involved. This does not appear to be the case, however. Operating expenses and operating revenues per line fall steadily from left to right across the table, with the Bell Operating Companies having the highest costs and the tiny Class B independents having the lowest costs. Further, the pattern is consistent. REA cooperatives have higher operating costs than the Class B independents; the REA commercial companies have higher costs still; the average independent has higher costs; and the Bell companies have the highest. Operating expenses, in the form reported, exclude fixed charges. Thus, to the extent rural companies have high facility costs but low operating costs, the results might be consistent with conventional wisdom. However, the fixed charges, which are shown on line six of Table C-2, indicate no consistent pattern: smaller companies do not appear to have higher interest payments than the larger companies on a per line basis.

Investment in telephone plant is shown in Table C-3, broken down by type of facility. Rural companies have higher per subscriber costs associated with providing a loop between the customer and the central office (that is, outside plant). This tends to be offset, however, by lower investments in other areas, such as central office equipment.

Independent companies and REA companies may have somewhat more investment per access line than the Bell Operating Companies, although this is not clear if depreciation is taken into account. Indeed, in terms of net investment, the companies with the highest average investment are the Bell Operating Companies, as shown in Table C-4. ^{5/} The independents have slightly lower costs, the REA companies are lower still, and the lowest investment costs are reported by the tiny Class B companies.

Labor costs are also important in contributing to cost differentials among companies. Salaries for employees of the Bell Operating Companies are significantly higher than those reported by the independents. While there is no information on salaries for smaller companies, it is commonly thought that the salaries are much lower among small companies in rural areas. Further, smaller companies have fewer employees per line served.

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5. The FCC defines net investment as total plant in service, less reserves for depreciation and amortization.

TABLE C-2. 1981 REVENUES AND EXPENSES, PER ACCESS LINE, BY TYPE OF COMPANY (In dollars)

Revenues and Expenses	Bell Operating Companies	Reporting Independent Companies	REA Commercial Companies	REA Cooperatives	Independent "Class B" Companies
Operating Revenues	642	577	468	394	306
Operating Expenses	531	454	369	310	259
Net Operating Income	112	123	99	84	47
Other Income	2	8	7	16	a/
Available for Fixed Charges	114	131	105	100	a/
Fixed Charges	45	58	47	45	a/
Net Income	69	73	59	55	a/

SOURCES: Federal Communications Commission, Statistics of Communications Common Carriers, Year Ended December 31, 1981; United States Independent Telephone Association, Independent Telephone Statistics, vol. 1 (1983 edition); United States Department of Agriculture, Rural Electrification Administration, 1981 Statistical Report, Rural Telephone Borrowers.

a. Not available.

TABLE C-3. COMPOSITION OF TELEPHONE PLANT IN SERVICE, PER ACCESS LINE SERVED, FOR 1981
(In dollars)

Investment Category	Bell Operating Companies	Percent	Reporting Independent Companies	Percent	REA Borrowers	Percent
Land and Buildings	139	8.9	112	6.4	108	6.5
Central Office Equipment	517	32.9	604	34.5	492	29.4
Customer Stations <u>a/</u>	353	22.4	379	21.7	264	15.8
Outside Plant <u>b/</u>	503	32.0	603	34.5	749	44.7
Miscellaneous <u>c/</u>	59	3.8	53	3.0	62	3.7
Total Plant in Service	1,572	100	1,750	100	1,677	100

SOURCES: Federal Communications Commission, Statistics of Communications Common Carriers, Year Ended December 31, 1981; United States Independent Telephone Association, Independent Telephone Statistics, vol. 1 (1983 edition); United States Department of Agriculture, Rural Electrification Administration, 1981 Statistical Report, Rural Telephone Borrowers; AT&T Long Lines, Long Lines Statistics, 1960-1982.

NOTE: Numbers may not add to totals because of rounding.

- a. Station apparatus, station connections, and large private branch exchanges.
- b. Pole lines, aerial cable, underground cable, buried cable, submarine cable, aerial wire, and underground conduit.
- c. Organization, franchises, patent rights, furniture and equipment, and vehicles and other work equipment.

TABLE C-4. INVESTMENT, EMPLOYEE COMPENSATION, AND LINES SERVED PER EMPLOYEE, FOR 1981

	Bell Operating Companies	Reporting Independent Companies	REA Commer- cial Companies	REA Coopera- tives	"Class B" Companies
Plant In Service/ Access Line (In dollars)	1,572	1,750	1,677 <u>a/</u>		1,299
Net Plant/ Access Line (In dollars)	1,330	1,317	1,236 <u>a/</u>		869
Compen- sation Per Employee (In dollars)	23,342	19,647	<u>b/</u>	<u>b/</u>	<u>b/</u>
Access Lines/ Employee	105	107	155	169	<u>b/</u>

SOURCES: Federal Communications Commission, Statistics of Communications Common Carriers, Year Ended December 31, 1981; United States Independent Telephone Association, Independent Telephone Statistics; United States Department of Agriculture, Rural Electrification Administration, 1981 Statistical Report, Rural Telephone Borrowers.

- a. Average for REA commercial companies and cooperatives.
- b. Not available.

The Bell system averages 105 access lines per employee and the independents average 107. The number rises to 155 for REA commercial companies and to 169 lines per employee at the REA cooperatives. These two factors--lower salaries and more lines served per employee in smaller companies--tend to offset the disadvantages of serving less dense areas.

It is hard to find any evidence that, on average, telephone service is more expensive to provide in rural areas. While rural companies do have less density and therefore less opportunity to take advantage of certain economies of scale, they have offsetting advantages, including lower salaries and more lines served per employee. Thus it appears that the cost of telephone service in rural areas is somewhat like retail distribution or other rural services--that is, a thinner network is not necessarily more expensive. It should be noted, however, that there may be quality differences between urban and rural services that are provided for the same costs. Thus, a larger percentage of rural customers are on party lines rather than having single-line service, and urban customers have the advantage of larger local exchanges. ^{6/}

Table C-5 contains statistical data for all REA borrowers. The companies are arranged in size, with the larger companies on the left and the smaller companies on the right, following the same pattern as in the previous tables. If smaller companies demonstrate higher costs, it should be reflected within the universe of REA borrowers and in the data in Table C-5. No clear pattern emerges, however, and there is no evidence that smaller companies have higher costs. ^{7/}

One of the most striking features of the statistical data for REA companies is the diversity of individual companies. Table C-6 provides statistical data for REA companies showing, for each size category, the 25th percentile, median, and 75th percentile company. Within each size

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6. In 1981, 95 percent of Bell's residential customers received one-party service. The comparable figures were 77 percent for REA commercial companies and 91 percent for REA cooperatives.
 7. These results are consistent with those of Warren Lavey, who found that larger REA companies had more investment per subscriber than smaller REA companies. Lavey also found a significant relationship between density (the number of customers served per route mile of line) and costs--a doubling of density led to a 10 percent reduction in average revenue requirements. Warren G. Lavey, Factors Influencing Investment, Costs, and Revenues of REA Telephone Companies (Harvard University Program on Information Resources Policy, 1982).

TABLE C-5. MEDIAN REVENUES AND EXPENSE PER SUBSCRIBER FOR
REA BORROWERS, FOR 1981 (In dollars)

	Over 4,999	3,000 to 4,999	2,000 to 2,999	1,500 to 1,999	1,000 to 1,499	750 to 999	500 to 749	Under 500
Number of Borrowers	177	173	130	87	130	88	91	71
Operating Revenues	440	384	395	349	378	383	361	341
Operating Expenses	344	313	315	291	318	309	308	312
Net Operating Income	89	73	72	64	68	66	66	46
Other Income	6	8	7	7	12	10	11	20
Total Fixed Charges	48	39	37	30	33	28	31	30
Net Income	50	46	44	43	57	47	51	55

SOURCE: United States Department of Agriculture, Rural Electrification Administration, 1981 Statistical Report, Rural Telephone Borrowers.

category, there is a wide range of variation that appears to diminish slightly as company size increases. Among the smallest companies, for example, a quarter of all the companies have annual operating costs of less than \$256 per line, and a quarter of the companies have annual operating costs of \$528 or more. Thus, the data indicate extreme variability among REA borrowers. ^{8/} While it appears that there is a great deal of variation

8. The observed variability may reflect actual cost differences or may reflect "lumpiness" in system expansion.

TABLE C-6. ANNUAL PER SUBSCRIBER OPERATING EXPENSES FOR REA BORROWERS, FOR 1981 (In dollars)

Number of Subscribers	Lower Quartile	Median	Upper Quartile	Interquartile Range As a Percent of the Median
1-499	257	312	529	87
500-749	235	308	427	62
750-999	246	309	439	62
1,000-1,499	254	318	463	66
1,500-1,999	245	291	374	44
2,000-2,999	268	315	397	41
3,000-4,999	250	313	401	48
Over-5,000	255	344	411	45

SOURCE: United States Department of Agriculture, Rural Electrification Administration, 1981 Statistical Report, Rural Telephone Borrowers.

and that some small companies have very high costs, it cannot be concluded that, on average, smaller companies have higher costs. It seems likely that companies with high loop costs (and whose customers would ultimately face high end-user charges) are companies that have recently undertaken major expansion. Construction of new facilities at high interest rates may be a much more important determinant of high costs than either density or company size. When the FCC calculated the payments that would be made from its Universal Service Fund to companies with high subscriber plant

costs, it found that a quarter of all payments would be made to companies in the state of Florida, far out of proportion to any measures of company size or density. ^{9/}

Some major differences do exist, of course, between rural and urban companies. The smaller rural companies tend to have a greater proportion of residential customers and a greater dependence on toll revenues, for example. But the absence of a systematic relationship between company size and costs complicates the problem of dealing with any adverse consequences of reducing toll support. Thus attempts to assist customers of small or rural companies would aid customers of both high-cost and low-cost companies, and it is not clear that an effort restricted to rural areas would benefit the majority of persons most adversely affected.

9. Similarly, a study of the United Telephone system found that the age and cost of plant as well as the volume and average length of haul for toll traffic had a much more significant effect on cost than density. Federal Communications Commission, Docket 80-286, Order Requesting Further Comments, released November 15, 1982, p. 9.